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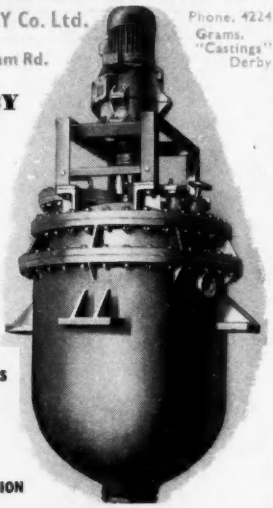

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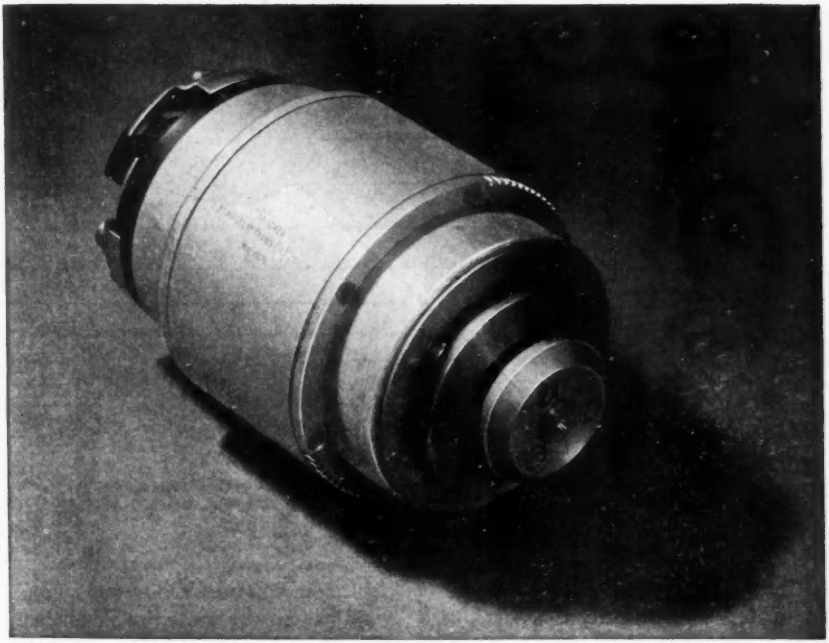

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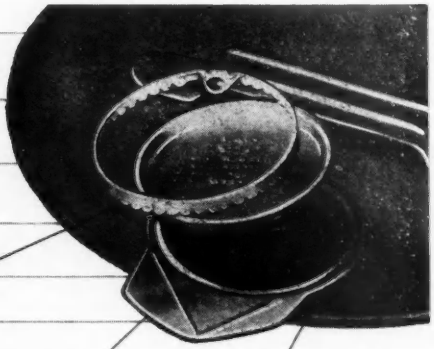

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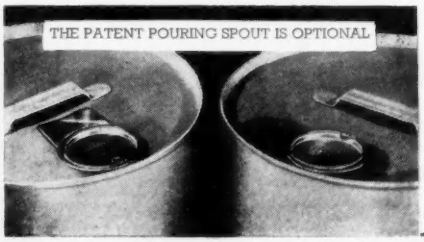

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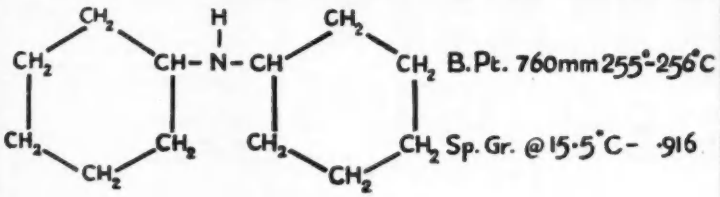

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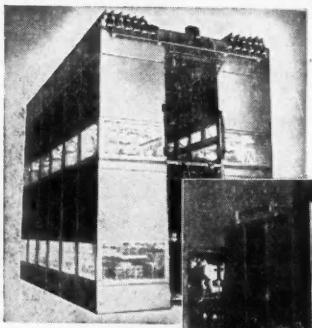

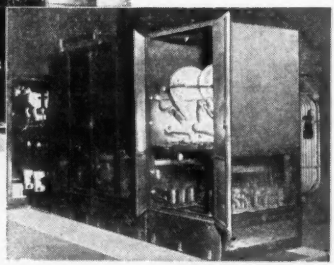

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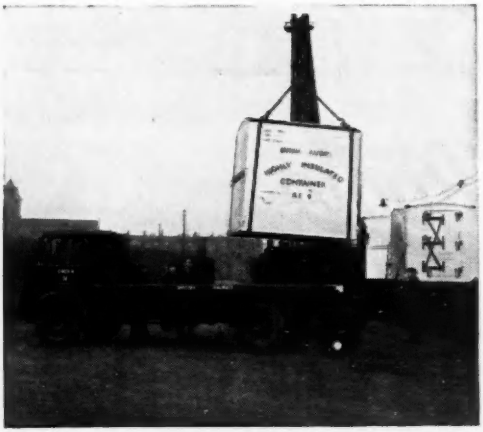

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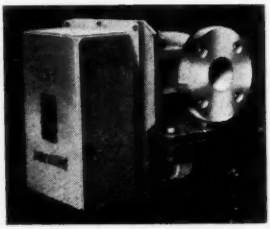

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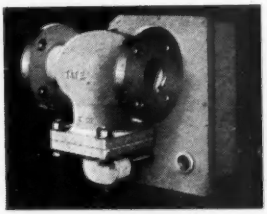

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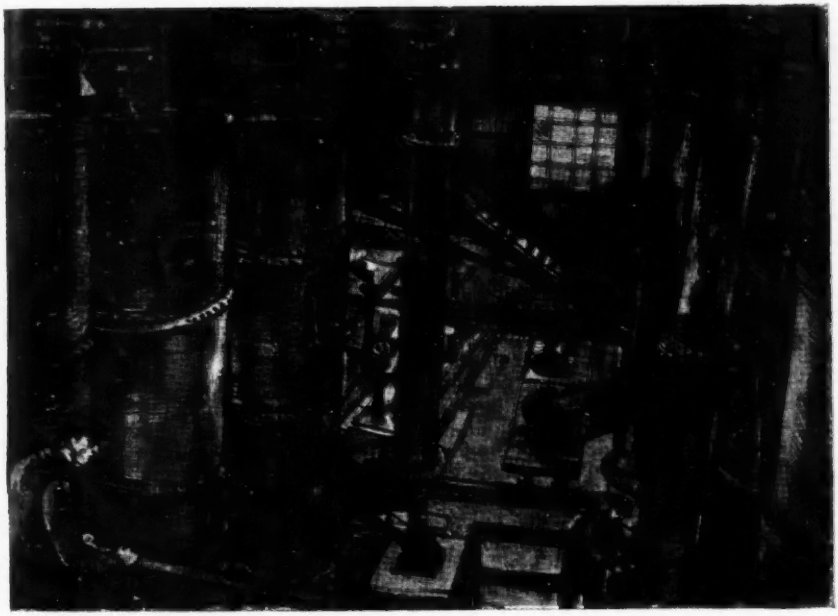

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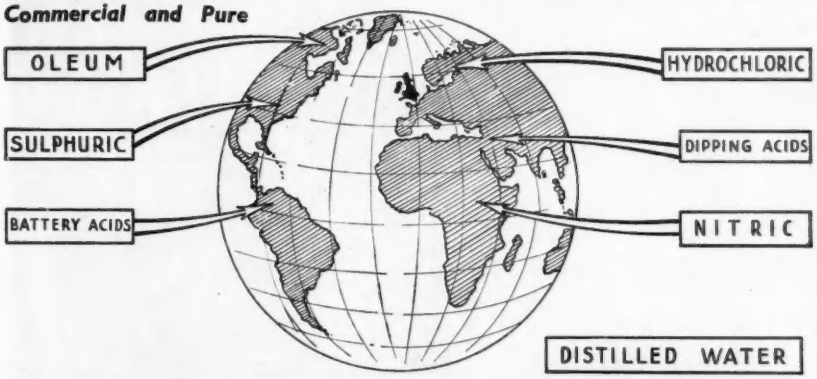

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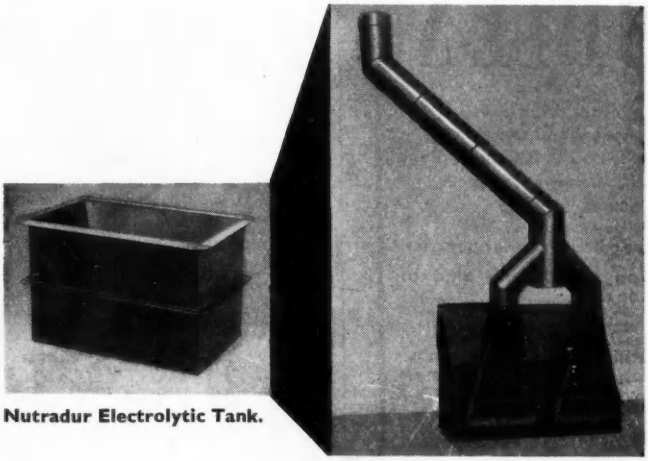

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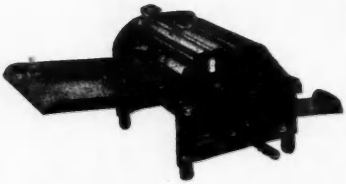

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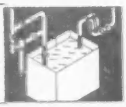
DRAWING **T44** *Temperature control installation for plating vats.*



Temperature control system for chrome plating vats. DRAWING **T45**

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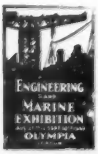

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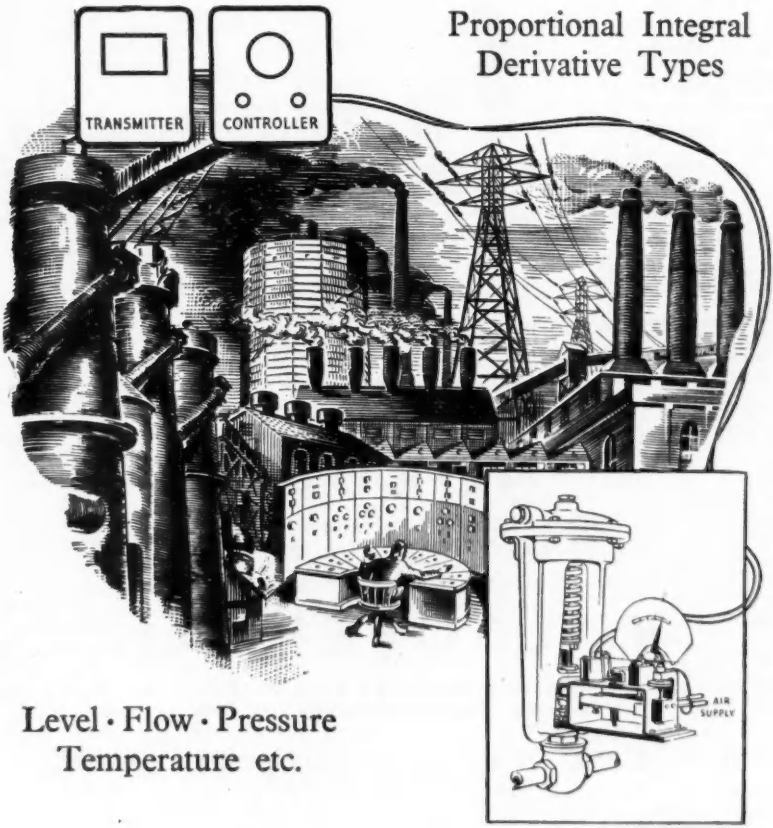

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Coal—Or Chemicals?

WHOEVER exercises monopoly control of the coal resources of the country holds in his hand one of the prime essentials for the maintenance of an active chemical industry. That is a truism which in the past has caused little concern because the functions of the closely integrated partnership between coal and its highly elaborated array of chemical products were clearly defined and the partners were content to remain as specialists each in his own department. That state of affairs had been attended with all the evidences of prosperity for more than a generation prior to the profound changes brought about in the deparment of coal raising by the nationalisation of the mines. The raw material was forthcoming in sufficiently regular and ample quantities to enable the chemical partners to build up in security great industries for the extremely varied distillation products, which have conferred great benefits on a host of subsidiary industries—tar and surface coatings, pharmaceuticals, dyestuffs, some textiles, fertilisers and others as far ranging and as profitable in the home and export trade.

For the moment, that imposing structure in which so large a part of the country's heavy industries are still contained, looks very much as it did before war and later the nationalisation of the mines robbed the system of some of its security. The quantity and quality of coal supplies have conspicuously deteriorated, but there have been good reasons to expect that the worst phase of this lowered efficiency was passed. The gradual approach to more efficient coal getting was the theme of much of the recent annual report of the National Coal Board, which is faced, however, with disconcerting evidence that coal raising alone can still barely cover the very high production costs. And, like all nationalised industries, the NCB will have no compunction in ousting any of the former partners of the coal-chemical alliance if there are substantial profits to be had by doing so.

All these factors are now being called to mind in connection with one of the subsidiary, but evidently significant, themes of the recent NCB report. That recalled, for example, that the board's coke ovens, enjoying top priority in coal supplies, were able to increase very largely their coke and gas production. It follows that there was a corresponding increase in by-products, which the board found are readily saleable. The board did not miss the significance of this possibility of balancing some of its much less profitable activities. "At present the board's by-product plants distil only a

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quarter of the crude tar they produce, the remainder being sent to private distillers under contracts inherited from colliery companies," says the report. "The board propose in future to distil more of their tar themselves where this can be done efficiently and profitably. They therefore gave notice during the year to end a number of contracts with distillers. These contracts covered nearly a quarter of the board's output of tar."

That policy statement reflects one of the least attractive proclivities of a nationalised corporation, which will unhesitatingly make incidental monopolies of its own by-products regardless of the damage that may inflict on flourishing industries which its predecessors served. It is in effect the backstairs route to furtherance of State control without the substantial compensation the older method demands. Working up of by-products in the manner mentioned in the board's report is only the first step. It may well be that intermediate products and finally finished products will be added as the years go by. Since the NCB and the Area Gas Boards have control of by far the largest share of coal by-products it would be difficult to say where this might end.

The NCB is already the biggest individual producer of motor benzol in the country. Its output in 1948 was about 12½ million gallons. Nearly all this was marketed through the National Benzole Company of which the board is a member. Benzol fractions such as pure benzol, toluole, xylole and naphtha were supplied to the dye, lacquer, paint and varnish trades. They were also supplied for use as solvents, waterproofing agents, textile finishes and as raw material for the production of resin and for other chemical processes. Creosote oil was supplied to Imperial Chemical Industries for the production of petrol by hydrogenation and the 66,750 tons of sulphate of ammonia distributed through the Sulphate of Ammonia Federation was a good deal less than the market would readily have taken.

This gratifying evidence of the saleability of things other than coal, is evidently offering to the NCB the strongest temptation to ease its unstable finances at the expense of more competent departments of industry and of its own primary function.

Notes and Comments

Pioneer Work

MOST of the exhibits shown last week at the Chemical Research Laboratory were indicative of a steady continuation of important basic work of the kind that ultimately lies behind all striking new discoveries. Whereas the first post-war exhibitions put on view the discoveries of an eight-year period, the annual shows have necessarily less ground to cover and show a correspondingly smaller element of innovation. In the extraction and examination of low-melting gallium, however, this country is entirely a pioneer. The extraordinary anisotrophic properties of this metal are now being recognised, and it is evidently of great importance now that due thought should be applied to the problems of application and of large-scale extraction. After unfortunate experience in the past, such as that associated with large-scale penicillin production, it would be inexcusable if fundamental advances such as this were not fully developed here. It needs to be repeated that the work of our scientists, including those at the Chemical Research Laboratory, is potentially valuable export, yielding a maximum return for a minimum of "material."

CRL and NPL

THE recent report of the Chemistry Research Board for 1947 and the opportunity of seeing some of the work described during the "open day" last week at the Chemical Research Laboratory also confirm the impression that research of a very high quality continues at Teddington. One of its most practical aspects has been the work on corrosion under the gifted direction of Dr. W. H. D. Vernon—in which the effective use of sodium benzoate as a corrosion inhibitor incidentally recalls how commonly current conditions favour the short-term policy in research. Some of these conclusions might very well lead to the solving of much wider and more fundamental problems. While the quality of the work at the CRL is undoubted, it is not easy entirely to dismiss the impression that the scale of operations at the neighbouring National Physical Laboratory has more closely matched the vigour of the British chemical industry. There are many likely explanations, including the probable answer that the industry prefers as a rule to solve its own problems rather than pass them on to a central agency. Yet there are functions better undertaken by the group organisation. A notable example, from the NPL, has been the work of its Metrology Division in maintaining standards of chemical purity. Chemical industry does not lack fundamental problems of great importance, the solution of which is certainly beyond the power of smaller industrial units. These cannot support their own research and their requirements are too diverse to be satisfied by existing group facilities. Clearly the time is ripe for a major expansion of the CRL.

Fermentation and Solvents

FERMENTATION, one of the most potent and productive procedures in chemical industry, old in its uses long before chemistry had any recognisable form, is commanding new attention because of two impending events, one of which is in a sense a rival of the fermentation method of solvents production. That is the forthcoming opening at Stanlow, in Cheshire, of the £4 million plant with which Shell Chemicals, Ltd., will provide the first example in this country of the bulk production of commercial solvents as derivatives of petroleum (pages 45-47, this issue). The notion that this enterprise, large as it is in its initial scope and full of promise for the future, is in any sense a rival of traditional fermentation methods is, of course, an illusion. If it serves even as a large supplementary source of

industrial solvents, in addition to all the other chemicals which are to come from this elaborate installation, it will still present no danger of oversupplying current needs. Some idea of the versatility of the fermentation principle is conveyed in the programme produced for the Royal Institute of Chemistry symposium being held at St. Andrews during July 23 and 30: "Recent Advances in the Fermentation Industries." The many original studies being presented there by acknowledged experts of aspects of industrial fermentation call to mind the vast scope of the field which was opened by the perception of such workers in different periods as Pasteur, Weizmann, Wehmer and Rose, and leave no doubt that such achievements as the first production of penicillin did not necessarily represent the climax of this dramatic theme.

Fume Legislation

THE need to enlarge the comparatively elaborate machinery which has been built up in piecemeal fashion to ensure that chemical and associated industries do not dangerously pollute the atmosphere is recognised in a notification from the Ministry of Health this week. This makes it clear that there is a firm intention to introduce fairly quickly new legislation which will impose fresh responsibilities upon both the chief inspectors under the multifarious Alkali, etc., Works Regulation Act, 1906, and its various additions and upon industries capable of producing volatile emissions of organic sulphur compounds or the fumes associated with carbon black production and fluorine. The need for precautions against pollution from the latter two arises from the fact that the first, in its American form, is a new industry here and the destructive effects of the second were established by disconcerting evidence produced early this year by the Medical Research Council committee which studied the effects in Scotland of fluorine released during the electrolytic reduction of aluminium. Fluorine, which has lately been the subject of some painstaking investigation in the U.S.A. (THE CHEMICAL AGE, *60*, 882) was shown to have a very damaging effect on herbage and on sheep and cattle in the vicinity. It has to be borne in mind, however, that fluorine emission is by no means confined to the aluminium process. In varying degrees, it is contained in the fumes of many installations of much wider distribution—brick kilns, for example.

Carbon Black and Fluorine

THE changes intended by the Ministry of Health are in fact rather wider than the foregoing would suggest. A draft order has already been prepared which proposes, in addition to listing volatile organic sulphur compounds, carbon black fumes and fluorine as "noxious and offensive gases," would make carbon black plants, "fluorine works" and acid sludge works subject to registration. Several more processes associated with sulphuric acid production, bisulphite and cement would also come within the province of the Alkali Works legislation. It is satisfactory to observe, in view of the far-reaching effect of such additions to legislation as these, that the whole subject is to be examined at a public inquiry before the present order is confirmed and that individual firms, as well as associations, have the opportunity of making their views known to the Ministry beforehand. Such views must be presented before July 23 and in consideration of the large addition to equipment costs which the order may involve, this is clearly one of those contexts in which the facts from the industrialists' point of view should be adequately presented. While the desirability that all chemical processes should operate with the least possible damage to health and the countryside is to-day fully recognised in all responsible quarters, the end is not to be procured by any legislation passed without full acquaintance with the facts. It is not sufficiently widely known, for example, that even now some costly schemes for reducing emission of fume, gas or solids are held up by such factors as the shortage of plant and steel and the difficulties to-day of erecting large chimney stacks.

FURTHER FALLS IN MATERIAL PRICES

Vegetable Oils, Lactic Casein and Solvents

FURTHER reductions announced by the Ministry of Food last week end effect economies of £12 per ton in the official prices of the two common grades of unrefined linseed oil and of unrefined castor oil. This, the second reduction of controlled prices of these oils, brings the cumulative saving to users since the beginning of May to £32 per ton.

The new price schedule, which is for the 5-week period ending August 6, is as follows (per ton, naked, *ex*-works):—

UNREFINED: Linseed oil, from £150 to £138 per ton naked ex works; linseed oil foots, from £100 to £88 per ton naked ex works; castor oil crude firsts, from £122 to £110 per ton naked ex works; castor oil crude seconds, £115 to £103 per ton naked ex works.

The prices of all other unrefined oils and fats, and technical animal fats allocated to primary wholesalers and large trade users in the period will remain unchanged.

* * *

IN consequence of the recent fall in the prices of ethyl and butyl alcohols, British Industrial Solvents, Ltd., has announced price reductions for a large number of the solvents, plasticisers and intermediates derived from these materials. On July 1 and thereafter the following reductions will operate:—

Aldol	£11 per ton
Butyl lactate	£17 ,,
Butyl oleate	£4 ,,
Butyl phenol	£19 ,,
Butyl stearate	£15 ,,
Butyraldehyde	£14 ,,
Crotonaldehyde	£14 ,,
Dibutyl oxalate	£16 ,,
Dibutyl phthalate	2¾d. per lb.
Dibutyl tartrate	£74 per ton
Diethyl oxalate	£6 ,,
Diethyl phthalate	¼d. per lb.
Diethyl tartrate	£11 per ton
Dimethylacetal	£6 ,,
Ethyl hexanol	£16 ,,
Ethyl oleate	£1 ,,
Methyl acetate	£5 ,,
Paraldehyde, technical	£16 ,,
Paraldehyde, stabilised	£16 ,,
Tetrahydrofurfuryl acetate	£42 ,,
Tetrahydrofurfuryl stearate	£65 ,,
Tributyl citrate	£16 ,,

* * *

THE Board of Trade has announced that the price of lactic casein distributed through the agency of the Lactic Casein Importers' Association, Ltd., 23 St. Swithin's Lane, London, E.C.4, has been reduced by £22 10s. per ton, as from July 1.

The revised schedule of prices, which are net, *ex*-warehouse, is as follows:—

	1 ton and over per metric ton	Less than 1 ton per metric ton
30/60 mesh	£120	£125
90 ,,	£125	£130
Soluble ,,	£130	£135

Less than 1 bag, 3s. per kg.

Society of Chemical Industry

THE 68th annual assembly of the Society of Chemical Industry will be held in Manchester, beginning on Monday next. A comprehensive programme for the five days has been arranged including lectures, works visits, social and other activities.

Proceedings open on the evening of July 11, with a reception by Sir David Rivett, the president, at the Whitworth Hall, University of Manchester.

The annual general meeting follows at 10 a.m. on July 12, when the presidential address will be given. This will be followed by a luncheon at 12.30 p.m., at the Midland Hotel, by invitation of the Manchester section.

In the evening there will be a reception by the Lord Mayor of Manchester in the Town Hall.

The annual dinner will be held at 7.30 p.m., at the Midland Hotel, on Wednesday, July 13.

Included in an interesting programme are visits to the works of Courtaulds, Fibreglass, I.C.I., the Manchester Oil Refinery, and Petrochemicals.

Record Plastics Exports

The plastics industry was complimented on its export performance by Mr. Harold Wilson (President of the Board of Trade) speaking at the luncheon in London recently of the Plastics Institute. The export in 1948 of 19,300 tons of plastics was 5½ times as large as the total exported in 1938, he said. Australia and India were our best markets, but no less than 12 per cent of all exports went to hard currency areas.

NON-FERROUS METAL STATISTICS

MAY figures for production, consumption and stocks of non-ferrous metals in the United Kingdom, show a general increase in stocks above the April totals, although consumption was greater in May than in the previous month.

Unalloyed copper and alloyed copper products in May reflected an increase of 5238 long tons on the April output.

An abstract of the monthly figures supplied by the British Bureau of Non-Ferrous Metal Statistics is given in the accompanying tables.

UNWROUGHT COPPER

	Long Tons	
	Blister Copper	Refined Copper
OPENING STOCKS:		
Govt. and consumers'	37,344	78,009
Imports	10,754	14,001
PRODUCTION:		
Primary	—	8,760
Secondary	3,388*	6,629
CONSUMPTION:		
Primary	8,799	23,269
Secondary	—	18,980
Exports	2,360†	12
CLOSING STOCKS:		
Govt. and consumers'	38,209	79,282

* Rough copper.

† Includes 904 tons rough copper dispatched to Belgium and 1456 tons of rough copper to Germany, for refining on toll.

GROSS OUTPUT OF MAIN COPPER, ALLOY AND PRODUCTS

Unalloyed copper products	25,938 long tons
Alloyed copper products	22,862 ,, ,,
Copper sulphate	4,093 ,, ,,

UNWROUGHT ZINC

	Long Tons	
	Zinc in Concentrates (estimated gross Zinc content)	Slab Zinc (all grades)
OPENING STOCKS:		
Govt. and consumers'	14,723	50,580
Imports	1,798	18,147
PRODUCTION:		
Virgin and remelted ...	—	4,986
CONSUMPTION:		
Virgin (incl. debased)	5,866	14,330
Remelted and scrap ...	—	8,109*
Exports	—	49
CLOSING STOCKS:		
Govt. and consumers'	10,655	60,741

* Includes small quantity of zinc in concentrates consumed directly for chemicals, etc.

LEAD

	Long Tons			Lead Content of secondary Scrap and Residues
	Lead in Concentrates	Imported Virgin Lead	English Refined	
OPENING STOCKS:				
Other than Govt. and consumers'	54	32,147*	793†	—
Imports	—	19,755	—	33
PRODUCTION: ...	191	—	2,325	—
CONSUMPTION: ...	197	11,505	3,008	12,571
Exports	—	49	—	—
CLOSING STOCKS:				
Other than Govt. and consumers'	48	43,160*	3,500*†	—

* Govt. and consumers'.

† Includes adjustments not previously reported.

TIN METAL

	Long Tons
GOVT. AND CONSUMERS' STOCKS (at end of period)	14,843
IMPORTS	208
PRODUCTION	3,125
CONSUMPTION	1,614
EXPORTS AND RE-EXPORTS	108

ANTIMONY

	Long Tons
TOTAL CONSUMPTION OF ANTIMONY METAL AND COMPOUNDS	392
TOTAL CONSUMPTION OF ANTIMONY IN SCRAP	289

CADMIUM

	Long Tons
TOTAL CONSUMPTION OF CADMIUM	39.15

Refinery Alcohol

THE importance of the new source of industrial alcohol represented by the Shell Chemical Corporation at Deer Park, Houston, Texas, was emphasised by the president of the Shell Oil Co. of Canada, Ltd., Mr. W. M. V. Ash, speaking in Montreal recently. The plant accounting for $12 million of the $54 million allocated by the Corporation for development would produce annually from the ethylene of a nearby refinery the equivalent in ethyl alcohol of what could be produced by 45 million bushels of grain. The relatively direct conversion would be very much cheaper than the fermentation of molasses and beet sugar, which was the source of most ethyl alcohol in the past.

ECA Chemicals

AN Economic Cooperation Administration report showing the totals by commodities of procurement authorisations granted all European countries under the Marshall Plan from the beginning of the programme, April 3, 1948, to June 1, 1949, reveals that $145.7 million have been allocated for chemicals and related products. The principal chemical authorisations were these (in $ million): Medicinal and pharmaceutical preparations, $28.4; industrial chemicals, except alcohol, $18.8; alcohol, $13.2; pesticides, $1.5; other, $83.3. Earmarked for other supplies were: Nitrogenous fertiliser, $21.4; other fertiliser, $14.7; copper, $157.7; aluminium, $63.8; zinc, $55.1.

UTILISATION OF NUCLEAR ENERGY

Problems for Chemical Engineers

THE lack of special instruments and the effects of radiation on materials used in nuclear physics are raising a host of fundamental problems for instrument makers and chemical engineers. Upon their successful solution depends to a large degree the further development of nuclear physics in industry. Inadequate development of instruments for use in areas of intense radiation and high temperature threatened to limit the operation of the first atomic power plant.

This was the view expressed by David Cochran and C. A. Hansen, Jr., engineers of the General Electric Co., at the Knolls Atomic Power Laboratory, Schenectady, New York, when they addressed the semi-annual meeting of the American Society of Mechanical Engineers, San Francisco, California, at the end of June.

Lack of instrument testing facilities was the biggest obstacle to the development of instruments for operating and maintaining an atomic power plant. Only a few places existed in the United States, they pointed out, where the effect of radiation on materials and devices could be studied or where liquid metal cooling systems were available for instrument testing. Nowhere, they added, was there the combination of radiation and extremely high temperature such as would exist in an atomic power plant.

So far, they said, there were no demonstrated solutions to the unusual instrument problems presented by nuclear energy, but more and better testing facilities were now being built.

Instruments were needed in the plant for control and safety of plant operation; for observing the condition and behaviour of the plant as its operation proceeded; and for monitoring radiation leakage for the protection of operating personnel.

Vital Characteristics

Essential requirements included extreme dependability, remote maintenance, resistance to neutron and gamma radiation, absolute leak tightness and long service.

Maintenance by remote control was necessary, as it was not possible to perform direct inspection and maintenance work on the detecting devices within the radioactive zone. When a failure occurred it might be necessary to remove and replace the instrument by means of remotely operated equipment.

If a device had become radioactive in service it could not usually be repaired after removal, but had to be replaced with a new unit. Where the detecting elements were very difficult to remove or were completely inaccessible, it would be necessary to install stand-by detecting elements when the plant was built.

Resistance to radiation was vital because pressure, temperature and flow detectors must function correctly in the presence of tremendous radiation. Continued exposure to radiation must not cause such physical deterioration of the device likely to change its performance in any way that could not be determined and compensated for. Also, devices to detect chemical contamination of the coolant must function in spite of the radioactivity of the coolant.

Gas Leakage Danger

Detecting elements exposed to the coolant or blanket gas must be absolutely leak-proof, because the escape of even minute quantities or radioactive coolant might cause a serious hazard. Similarly, if the blanket gas contained any gaseous fission products or radioactive dust particles, the leakage of gas might be dangerous.

Because of the extreme difficulty and expense of replacing faulty detecting elements, long operating life was much more important in these applications than was usually the case, they continued. There was great incentive to develop long-lived devices, and ample justification for employment of more expensive methods to insure long service. It was certainly to be hoped that instrument failures would not become the cause for shutting down the plant.

Before the address by the G.E.C. engineers, the whole problem of adapting nuclear energy as a source of power was surveyed by Glenn T. Seaborg, the eminent American scientist, who is a member of the General Advisory Committee to the U.S. Atomic Energy Commission and professor of chemistry at the University of California. He was also a co-discoverer of a number of fissionable isotopes.

Problems that must be solved before atomic energy could be made useful were largely engineering, Mr. Seaborg said. Machines must run at high temperatures in order to extract the energy in useful form, he explained, and this meant that there would be problems involving materials of construction. Such materials would also have to be chosen from those whose neutron absorption was small and this limited the choice to uncommon substances.

EXPLOITING RESEARCH

Wide Powers of Development Body

THE names of the chairman and members of the National Research Development Corporation were announced in the House of Commons last week.

Replying to a question by Mr. A. R. Blackburn, the President of the Board of Trade recalled that Sir Percy Mills had accepted his invitation to become chairman. The five other directors appointed were: Prof. P. M. S. Blackett (Manchester University); Sir John Duncanson (steel); Sir Edward Hodgson (Board of Trade); Mr. W. E. P. Johnson (Power Jets Corporation); and Sir Edward de Stein (formerly Ministry of Supply).

Lord Halsbury's appointment as managing director had been announced in May, said Mr. Wilson (THE CHEMICAL AGE, 60, 712), and the corporation accordingly came into existence on June 28.

To Exploit Inventions

The functions of the corporation are defined in the Development of Inventions Act, 1948, under which the corporation was set up, as follows:—

(a) of securing, where the public interest so requires, the development or exploitation of inventions resulting from public research, and of any other invention as to which it appears to the corporation that it is not being developed or exploited or sufficiently developed or exploited;

(b) of acquiring, holding, disposing of and granting rights (whether gratuitously or for consideration) in connection with inventions resulting from public research and, where the public interest so requires, in connection with inventions resulting from other sources.

The expression "invention" includes any new process or new technique and the Act will construe it without regard to whether or not a patent has been or could be granted. "Public research" means research carried out by a Government department or other public body or any other research in respect of which financial assistance is provided out of public funds. The corporation is thus empowered to develop and exploit inventions over which the Government has the right of proprietor (e.g. inventions in the possession of Government departments), and also inventions emanating from private sources which are likely to be of benefit to the community and are not being adequately used already.

The corporation, which may borrow up to £5 million from the Treasury within five years, has yet to appoint its staff.

FUEL GAS RECOVERY

Practical Use of Natural Methane

ONE of the most interesting developments at the Mogden sewage works of the Middlesex County Council, recently visited by members of the London and South-Eastern Counties Section of the Royal Institute of Chemistry, was the gas recovery associated with the aeration tanks.

Here the visitors saw how the settled sewage was aerated with activated sludge which, after a final settlement, was clear and fit to pass into the river.

The sludge, which is separated during the purification process, is digested at 80°F. and methane is generated.

After viewing the digestion tanks and gas holders where the methane is stored, the party proceeded to the compressor rooms where the gas is compressed to 5000 p.s.i. It is bottled, at 3000 p.s.i. and used to drive vehicles. The residue is used to drive pumping engines, and generally provide heat and power throughout the works.

A film "Taken for Granted" which gave a general outline of the various processes was shown before the tour of the works.

CHEMICAL EMPLOYMENT

THE numbers employed in the chemical and allied trades in Great Britain in April remained steady, showing little deviation from the previous month.

Figures published in the current issue of the *Ministry of Labour Gazette* show sectional distribution as follows:—

Industry	Thousands April, 1949	March, 1949	Mid 1948
Coke ovens and by-product works	17.7	17.6	17.3
Chemicals and dyes	196.7	196.8	195.5
Pharmaceutical preparations, etc.	31.7	31.7	30.8
Explosives and fireworks ...	36.5	36.8	33.8
Paint and varnish	37.3	37.2	37.0
Soap, candles, glycerine, etc. ...	47.7	37.9	46.9
Mineral oil refining	33.8	33.8	30.7
Other oils, greases, glue, etc. ...	30.2	30.2	28.9
Total, chemical and allied trades	431.6	432.0	420.9

"Good Welding Technique"

In the report of a new U.S. procedure for welding 4-6 chrome pipe (THE CHEMICAL AGE, 60, 678), it was stated that a large preheating tip with oxyacetlyene was used first to bring the temperature of the joint up to 600-800°C. and maintain it while the welding was done. The temperature was then raised to 1200-1350°C.

Both these temperatures should have been given as Fahrenheit.

Shell's New Petroleum Chemicals

Stanlow Will Increase Bulk and Variety

THE impending opening at Stanlow of the newest Shell plant to produce chemicals from petroleum is the subject of a full explanatory statement by Shell Chemicals, Ltd., accompanied by an excellently produced book in which nearly every aspect of the Stanlow enterprise, technical and otherwise, is ably described and illustrated.

The current statement recalls that hitherto most of Britain's organic chemicals have been manufactured either from indigenous coal by distillation or from imported molasses or other carbohydrates by fermentation processes. The supply has been augmented by direct imports of finished products, natural and synthetic, from hard currency areas, including products of the U.S. petroleum chemical industry, which have stimulated keen interest here.

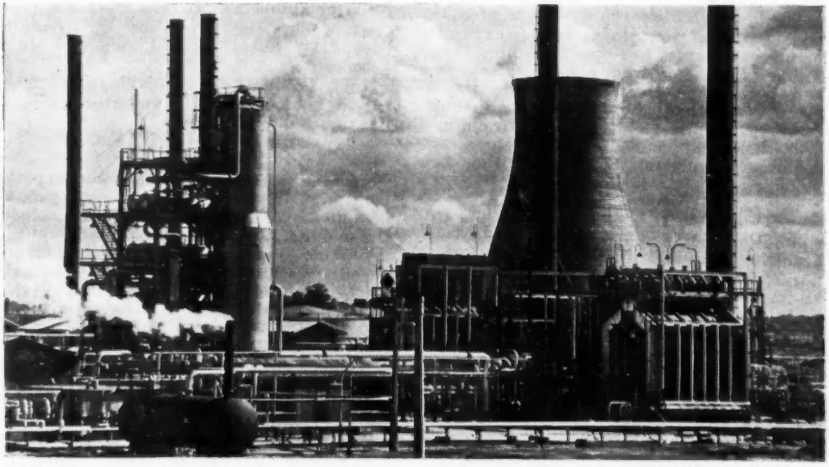
A considerable market for ketonic and alcoholic solvents, extractants and intermediates was thus built up in Britain, based on the earlier development in America of the highly reactive olefins obtained when petroleum is cracked. It was soon appreciated that the establishment of a similar industry within the sterling area, would not only satisfy the increasing demands for such chemicals, but would also save imports, either of raw materials or finished products, from hard currency areas—particularly if related to future refinery operations which would provide appropriate feedstocks from normal refining processes.

The need for a petroleum-based chemical industry in the U.K., therefore, has been fully recognised and there are several plants now nearing completion. One of the first to come on stream is the Shell plant at Stanlow.

Early Experience

The Shell organisation enjoys the advantage of having pioneered similar developments in the U.S.A. The earliest of these were the Martinez plants built by Shell Chemical Corporation for the manufacture of secondary butyl alcohol (1930) and methyl ethyl ketone (1933) from butylene, and of isopropyl alcohol from propylene (1935). These were followed in 1936 by another plant at Dominguez, near Los Angeles, for the further manufacture of isopropyl alcohol and acetone and the many derivatives.

The adoption of continuous operation which characterises the Shell Chemical



[Shell Photographic Unit

The large cracking unit and the converters at Stanlow and, in the background, the cooling tower

Corporation plants meant that entirely new types of plant had to be designed to function at the critical operating conditions frequently encountered. All the accumulated experience of the group is embodied in the design of the new units at Stanlow. Their situation near the Thornton research centre will facilitate continuous study of the varied technical problems involved in developing new chemicals and in utilising them to the best advantage in many derivatives.

The plant consists essentially of a thermal "cracker," with units specially designed to deal with the "cracked" products by fractionation, hydrogenation and polymerisation, synthesis and distillation, as well as a number of reactors and convertors. Continuous operation and highly centralised and automatic control are expected to render the productivity per worker the highest in any industry in Britain.

Low Pressure Process

The basic raw material for the plant is gas oil, cracked under carefully controlled conditions of high temperature and low pressure to give a high yield of hydrocarbons containing 3 and 4 carbon atoms. These fractions include a very high proportion of the olefins, propylene (C_3 stream) and butylene (C_4 stream) which, when separated, form the feedstocks for the manufacture of the solvents and other chemicals now being produced.

The new Stanlow refinery, at present under construction alongside the existing plants is designed to refine 2½ million tons a year of crude oil from non-dollar sources and will, when complete, provide these feedstocks without the necessity for special cracking. Complete integration of refining operations and chemical manufacture as achieved already in America, will thus be possible.

The C_3 fraction contains propane and propylene only. It is allowed to react with sulphuric acid in which the propylene is absorbed, forming alkyl esters, while the unattacked propane is separated and used as fuel. The alkyl esters are hydrolysed with water for the production of isopropyl alcohol, which is separated from the acid by stripping with steam and then purified by distillation.

Alcohols

In addition to butane, normal butylene, and isobutylene, the C_4 fraction contains other products which are removed from it by special chemical treatment. The mixture is then extracted with cold sulphuric acid of moderate strength which absorbs the isobutylene but does not touch the normal butylene or butane. Treatment with acid in the manner employed for the production of isopropyl alcohol then leads to the formation of alkyl sulphates from which secondary butyl alcohol is obtained by hydrolysis and distillation.

By heating to high temperatures under carefully controlled conditions and in specially designed equipment, the alcohols can be dehydrogenated to give the corresponding ketones, together with hydrogen in a high state of purity suitable for hydrogenation reactions. Isopropyl alcohol, on dehydrogenation, yields acetone and secondary butyl alcohol yields methyl ethyl ketone; both these products are also purified by distillation processes.

Under suitable conditions, acetone may be converted into diacetone alcohol which, in its turn, can be converted into methyl isobutyl ketone via mesityl oxide. All these products are purified by distillation.

Shell chemical engineers have brought the complicated and difficult processes of separation and distilliation to a very high degree of perfection. This makes possible the production of solvents of minimum 99 per cent purity, whose marketing specifications are those of essentially pure organic chemicals.

The range of solvents at present being produced at Stanlow is:—

From propylene (from the C_3 stream): Isopropyl alcohol, isopropyl ether, acetone, diacetone alcohol, metsityl oxide, methyl isobutyl ketone.

From butylene (from the C_4 stream): Secondary butyl alcohol, methyl ethyl ketone.

These products can be divided into three types—ketones, alcohols and ethers. Each has many industrial uses.

Many Solvents

Acetone is a low boiling ketone and a very powerful solvent which is widely used in industry. Its uses as a solvent include the manufacture of nitrocellulose lacquers, aeroplane dopes, paint removers, transparent paper, photographic film, celluloid, leathercloth, acetate rayon and explosives. It is employed in the extraction of many drugs and pharmaceutical products. As a raw material it is used for the manufacture of chloroform, synthetic perfumes and plastics, including methyl methacrylate.

Methyl ethyl ketone is very similar in solvent power to acetone, but has the advantage of being less volatile and therefore more easily handled. It is also a good extractant and is a useful raw material for chemical synthesis, being used in the manufacture of synthetic perfumes, rubber

accelerators and ketone/formaldehyde resins.

Methyl isobutyl ketone is a medium boiling ketone, and, like acetone and methyl ethyl ketone, possesses good solvent powers for surface coating applications and for extraction processes, besides being valuable as a chemical intermediate. It can be used for the purification of penicillin.

One of the most important industrial uses for diacetone alcohols is in the manufacture of hydraulic brake fluids. It is one of the few organic materials which offer complete miscibility with castor oil at high and low temperatures, a low freezing point and non-corrosive action, and it has the minimum effect on the rubber parts of the brake mechanism. It is also a useful high boiling solvent for use in finishes such as nitrocellulose and cellulose acetate lacquers. Being completely miscible with water, it is also of interest as a solvent for dyestuffs.

For Food Industries

Of the alcohols, isopropyl alcohol, besides being used as a latent solvent for lacquers, is employed for many extraction purposes, such as the manufacture of flavouring essences from fruit and other natural products. It is useful in the food processing industry as a dehydrating agent for starch and gelatine and as a precipitant in the extraction of pectin from citrus fruit.

Besides being a useful solvent in the surface coating industries, secondary butyl alcohol is used as an intermediate for the preparation of secondary butyl xanthate for use in ore flotation processes, and also as an intermediate in the chemical synthesis dyestuffs, flavourings and perfumes.

An interesting product of side reactions occurring during the formation of isopropyl alcohol is isopropyl ether. This compound, having a lower volatility than ethyl ethers, is of particular value as an extraction solvent.

[Shell Photographic Unit

The scale of the engineering achievement at Stanlow is revealed in this view of the distillation unit and its battery of fractionating towers

Suppressing Foam in Lubricating Oils

LUBRICATING oil can be satisfactorily defoamed by recycling it through a column of activated charcoal. This tendency to foam in use has consistently been a problem of internal combustion engine lubricants, since it impedes oil circulation, and reduces its lubricating efficiency. Searching for an answer to the problem, the U.S. National Advisory Committee for Aeronautics financed a series of experiments at Stanford University, and while the information gathered and embodied in the current report relates only to aircraft lubricants, the results may have broader application.

Experiments at Stanford showed that when a particular type of aircraft lubricating oil had been recycled through a charcoal column at 50° C. or lower, it produced, at 100° C., only one-tenth the volume of foam arising from untreated oil. Activated magnesium oxide, silica gel and Porocell, when packed in columns for recycling, also defoamed the oil to a lesser extent.

Extraction of oil with liquid sulphur dioxide, phenol or aqueous sodium hydroxide failed to produce any significant change in the tendency to foam. Nor did the dispersion of finely divided sodium chloride, followed by filtration.

The report notes that, despite the success of the charcoal defoaming method, the relatively little knowledge available concerning the nature of the action, or the constituents responsible for foaming, makes further study of the subject advisable.

Details of the present findings are contained in the newly issued "Attempts to Defoam Existing Oils by Processing," Technical Note 1845.

FLOATLESS LIQUID LEVEL CONTROL

Development of the Automatic Principle

AN important feature of a new automatic floatless level control unit, now available, is its high and adjustable sensitivity which enables it to be used with liquids of extremely low electrical conductivity. A good example of this is in the control of foams and highly aerated substances which formerly could not be dealt with satisfactorily by any commercially available floatless control.

The Elcontrol floatless level equipment is applicable to the majority of the more common chemicals, and a selection of probe fittings of various metals and insulating materials has been developed to give a long life with corrosive liquids.

The system is designed to promote a considerable extension of automatic control.

A number of units can be used jointly to proportion different liquids entering a mixing vat. Probes can be positioned in the tank to ensure that the correct volume of liquid enters and as each liquid reaches its maximum level it would serve to switch off the supply and to open a valve to admit the next liquid to the tank, and so on.

Where high purity fluids are being handled, probes consisting of platinum wire may be sealed into a glass vessel, thus giving complete freedom from contamination. In this way it is possible to handle double distilled water in a distillation plant.

It is worth noting that for pressurised containers probe fittings can be produced to withstand pressures of up to 3 tons p.s.i.

Electrolysis is completely eliminated by the use of a small a.c. voltage applied to the probes (6 volts). The control is also recommended for inflammable liquids.

In the application of the Elecontrol automatic floatless level control, type LL.1, as a high level alarm a single probe reaches to the point in the liquid vessel at which an alarm is to indicate the presence of liquid at its highest permissible level. A second " earthing " probe is necessary in all cases where the liquid vessel is glass lined or of an insulating material.

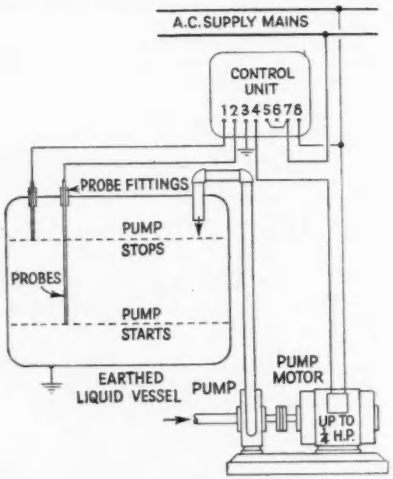
The alarm device may be a bell, indicator lamp or siren. An electric valve or pump may also be connected to restore normal conditions by removing excess liquid from the tank.

As a low level alarm a single probe is positioned in the tank to detect a fall in liquid below its lowest permissible level. An electric valve or pump may be connected to replenish the tank.

In either of these applications a pen recorder may be used to show the periodicity of abnormally high or low levels.

In some circumstances it is convenient to connect the control so that a high or low level warning is maintained until the circuit is reset manually by means of a press button. This is advisable when the liquid is surging and turbulent, otherwise the alarm would operate intermittently as the liquid made momentary contact with the probe.

Another arrangement to provide automatic resetting uses two probes. These are adjusted in length to give a small differential (according to local conditions). Connected as a high level alarm, when the liquid makes momentary contact with the upper probe the relay will energise to operate the alarm and transfer control to the lower probe. The alarm is then maintained until the level falls below the lower probe, when the relay de-energises to restore control to the upper probe. The alarm ceases.



[Courtesy of Elcontrol, Ltd.

A typical assembly of a two-level automatic control

CURRENT WORK AT THE CRL

Useful Advances in Metal Protection and Insecticides

WHILE many of the exhibits at the Chemical Research Laboratory, shown to scientists and the Press last week, represented steady developments in lines of work previously announced, some entirely new results also were revealed.

A great improvement has been made in the formulation of improved corrosion inhibitors for use in heat exchange systems. It has been found that sodium benzoate—previously indicated for this purpose—may be used in conjunction with sodium nitrite. Both laboratory tests and tests in working cooling systems are still in progress, but current results are very encouraging.

For example, an anti-freeze solution containing 20 per cent ethylene glycol, 1.5 per cent sodium benzoate and 0.1 per cent sodium nitrite has afforded excellent protection to metals in the cooling systems of motor vehicles in individual runs of 2500 miles each.

This combination of chemicals may also be incorporated in rubber latex and used for the " temporary " protection of fabricated iron or steel parts during storage or transport. Simple dipping of the article in the treated latex produces a film which combines some degree of mechanical protection with protection against corrosion. Machined surfaces covered in this way have remained perfectly bright under tests involving drastic conditions of humidity and moisture precipitation; in the absence of inhibitor rusting quickly develops beneath the film.

When no longer required the film can be readily removed by simple " peeling," without the use of solvents. Patents have been applied for in respect to these developments, *i.e.*, Nos. 10471/49 (heat-exchange systems) and 10703/49 (rubber latex).

Tar Derivatives

In the field of coal-tar derivatives acenaphthene has been dehydrogenated to the potentially valuable unsaturated hydrocarbon acenaphthylene and the latter has been examined as a source of industrially valuable plastics. High molecular weight polymers have been prepared by polymerisation of acenaphthylene and an interesting series of copolymers with styrene, isobutylene and butadiene has also been produced.

Copolymerisation with acenaphthylene brings about a marked elevation in the softening point of polymers. Determination of the composition of styrene-acenaphthylene copolymers, which is very difficult by other means, is now being easily achieved by studying their ultra-violet absorption spectra.

Specimens of gallium and germanium metals extracted from flue dusts derived from British coals were exhibited, as well as their compounds. The degree of anisotropy of gallium is unique. The ratio of thermal (and electrical) conductivities along the three principal axes is 1 : 3.2 : 7. By controlled seeding of the molten metal it has been possible to produce bars of various conductivities composed of single crystals. No applications of this unique property have yet been devised.

Hydrogenation Studies

The hydrogenation of diphenylene oxide and *o*-diphenol has been studied. Exhaustive hydrogenation of diphenylene oxide over a Raney nickel catalyst affords perhydrodiphenylene oxide, but some cleavage of the furan ring also occurs with the formation of cis-*o*-cyclohexyl cyclohexanol and cis-dicyclohexyl. Partial reduction gives tetrahydro-and hexahydro-diphenylene oxide.

The latter is also obtained by partial hydrogenation of *o*-diphenol, water being eliminated from the hexahydro-diphenol with ring closure. The existence of this hexahydro-diphenylene oxide, hitherto in some doubt, has been definitely established by examination of its ultra-violet absorption spectrum.

New insecticides have also been produced. During the high pressure hydrogenation of pyridine over a Raney nickel catalyst at temperatures over 180 °C. some hydrogenolysis of piperidine occurs, with the formation of a mixture of high-boiling bases, prominent constituents of which are N-n-butyl piperidine, N-cyclopentyl piperidine and NN'-pentamethylen dipiperidine. The crude mixture of hydrogenolysis products has been shown to be toxic to *Calandra granaria* and *Blatella germanica*. The constituents responsible for this insecticidal activity have been identified.

N-cyclopentyl piperidine has a rapid knock-down effect while the pentamethylene dipiperidine shows a slower form of the same property, followed by high rate of kill. A systematic study of N-substituted piperidines and other nitrogen-containing compounds is in progress.

ITALY'S OIL AND GAS

Big Expansions Proceeding

THE growth of oil technology and the implementing of the Italian-American programme to make Italy one of the main centres of mineral oil refining and storage in Western Europe (THE CHEMICAL AGE, *60*, 240) are reflected in further news from Italy.

Indicating the scope of one of the several refinery plans is the news that the installation in the Massa-e-Carrara region, between Liguria and Tuscany, to which approval has just been given, will be capable of processing annually some 2 million gal. of crude oil—from the Middle East. The plant will incorporate a furfural extraction plant for heavy lubricants and a continuous refinery for benzine and medium and heavy products. Total output will include 312,000 tons motor spirit, 546,000 tons gas oil, 1,113,000 tons fuel oil, as well as agricultural special fuels lubricants, white oil, bitumen, etc. The new refinery will be connected with the port of La Spezia.

Refinery and Docks

Another large refinery will be erected near Augusta, in Sicily, by the Raffineria Sic Olii Minerali, with rail connections and pipe lines to the large reservoirs of Punta Cugno. A large new dock, financed by ERP funds, is being constructed at Naples, capable of berthing five large oil-tankers.

In connection with the hydrogenation of mineral oils the A.N.I.C. (Azienda Naz. per l'Idrogenazione dei Combustibili) has just patented a new method for catalyst preparation consisting of oxides of elements of the 3rd, 4th, and 8th groups or of any other element capable of breaking the C-C, C-H, and H.H bonds. It may be used in processes intended either for high octane products or for refining lubricating oils.

Chief interest in the mineral fuel programme at the moment centres, however, in the natural gas resources. During 1948 and the current year the A.G.I.P. (Az. Gen. Ital. Petroli) in its exploration and development work has included rich discoveries near Lodi, of methane; the working of which by the end of this year will be sufficient, it is estimated, to supply the industrial needs of Lombardy and Emilia —more than 1 million cu. m. of gas per day. Already several supply pipe-lines have been installed from Caviaga, and it is expected that the important line to

(*Continued at foot of next column*)

Milan will soon be completed. The gas is at such high pressure that difficulty is being experienced in controlling its flow.

In the March-April issue of *La Ricerca Scientifica*, Mario Medici is an interesting description of the methane occurrences in the Triveneta district, mainly in the Venice and Rovigo provinces, where, in 1948, depths of 400-500 metres were reached and gas yields of 500 cu. m. per day.

A graph is given showing national production in 1948 as about 120 million cu. m. annually, against 90 million in 1947.

G.E.C. RESEARCH

Fluorescence & Radiation Techniques

THE three-day conversazione organised by the General Electric Co., Ltd., at its Wembley laboratories last week, included tours of the research laboratories, for the Press, representatives of industry and universities, and for the general public.

So interlinked are developments in technical progress that these laboratories, mainly concerned with electrical and illumination matters, offered an unexpectedly large variety of material of interest to the chemist.

In the fluorescent lamp, for example, the new fluorescent powders which give the desired colour without the blending of separate powders, were on display.

The metallurgy laboratories have been successful in the preparation of nickel alloys, with controlled concentrations of aluminium or magnesium and other metal compounds, to enhance the high-temperature strength of fine filament wire. A heavy alloy composed of tungsten, nickel and copper is also manufactured by powder metallurgy. Its high density of about 17 gm. per c.c. makes it particularly suitable for screening of radiations and for radium containers.

Among the conventional Geiger-Muller tubes displayed was an unusual 5 ft. high monitor, designed to stand alongside the doorways of research laboratories to detect the entry of unwanted sources of radiations during the course of radiochemical research.

Molecular resonance at millimetre wavelengths was also displayed by the effect in ammonia; as the pressure was reduced from atmospheric, the absorption of a signal of wavelength around 1.25 cm. was reduced and then split into narrow bands. Knowledge derived from these observations by wavelengths has greatly improved our knowledge of fundamental molecular structures.

THE EXTRUSION OF POLYTHENE

Successful Production of Large-Diameter Tubes

by E. G. FISHER, M.P.S.*

IN describing recent developments in the extrusion of polythene, and in particular the extrusion of large-bore tubes, it is necessary to pay some attention to the extrusion process as it applies to the plastics industry generally.

The extrusion process has been in use for many years in the metal working industries and the rubber industry has developed its own technique for the production of tubes and other products by extrusion. The adoption of this technique by the plastics industry, is, however, a relatively recent development, and much experimental work is continually being carried out in a search for greater outputs, and to increase the range of products which may be produced by this process.

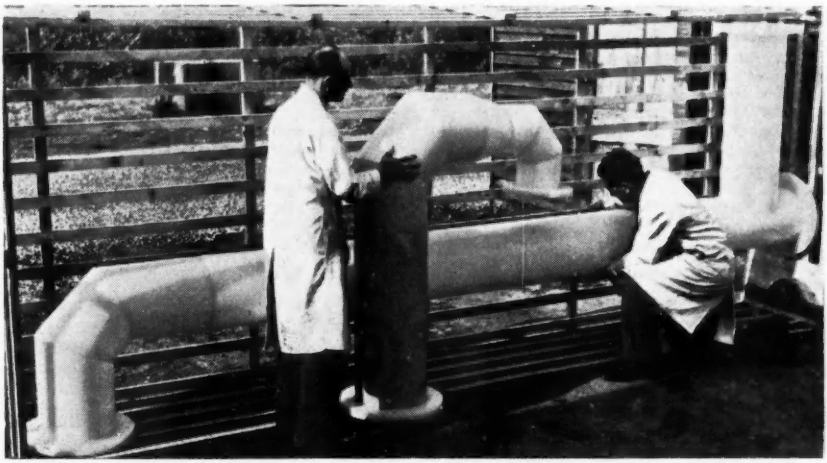
The machines used in the plastics industry for the extrusion of thermoplastic materials were developed from the original rubber forcing machines in which a rotating, water-cooled thrust screw operates in a hardened steel, heated cylinder.

The plastic material, usually in the form of chips, or kibbles, is fed in at a uniform rate by means of an electrically or mechanically operated vibrating mechanism to the rear end of the cylinder, and is picked up by the rotating thrust screw. It is carried forward through carefully controlled progressive heat zones and is finally forced out through the extruding die. Temperatures and other detail operating conditions are obviously dependent on the characteristics of the particular plastic being processed and may vary considerably.

The extruded thermoplastic passes from the extruding die in a very soft and plastic state which necessitates the exercise of extreme care in its handling. The finish and accuracy of the extrusion is determined to a large degree by the ingenuity and success of the method of take-off, and the equipment necessary is frequently more costly and certainly more intricate than the extruding machine itself.

The plain extrusion of polythene, that is, the simple passing of the material through the extruder, is not difficult, the plastic flows readily, does not easily decompose or burn, nor does it adhere to the thrust screw as do some other thermoplastics. Unfortunately, however, it melts

* Director of Technical Development, Tenaplas, Ltd.



A polythene installation of 12-in. tubing being made ready for shipment to Canada where it will replace iron equipment

sharply at approximately 110°C., and does not soften over a wide range in the manner, for example, of the vinyl plastics, and in consequence, under correct extruding conditions it passes from the machine as a viscous liquid and immediately loses all identity as an extruded product.

Polythene can be extruded at temperatures somewhat below the melting point of the material, and if this method is adopted a recognisable product can be more readily obtained. It is obvious, however, that unless the thermoplastic is taken at least to its melting point, the resultant extrusion will be under internal strain, and will almost certainly fail in service.

Tenaplas, Ltd., devoted some years of experimentation and research to developing a satisfactory commercial method of handling the extruded molten polythene. That the time has not been wasted is obvious from the fact that extruded polythene tubing of 12 in. bore with a $\frac{3}{4}$ in. or $\frac{1}{2}$ in. wall is now commercially available.

To permit the production of tubing up to 12 in. and even larger required much work in the adaptation of existing extruding equipment. The standard extruders to be used for this purpose were considerably modified in order to obtain the very large output of extruded plastic and to ensure a reasonably constant internal pressure.

The thrust screws were replaced by others of special design, calculated to give the optimum working conditions with polythene type plastics, and careful attention was given to the clearance between the thrust screw and the cylinder. The extruding dies presented a further problem, and many different designs were constructed and discarded before the type at present being used was adopted.

The success which has been obtained by Tenaplas in its new products has resulted from the logical and painstaking approach to a difficult task; the three main factors contributing to this success are:—(a) The extruding machine; (b) the extruding die; (c) the take-of method; and in each case difficulties which at times seemed insurmountable have been overcome. The designs of the Tenaplas extruding equipment are at present secret.

[Photographs by courtesy of Tenaplas, Ltd.

This assembly, showing the type of jointing successfully employed, is of the kind most suitable for the conveyance of acids

INDIA SEEKS TO DISPENSE WITH IMPORTED PLASTICS

THAT manufacturers of plastics in India should produce urgently needed industrial articles and utility goods cheaply is the recommendation of Mr. G. L. Mehta, president of the Indian Tariff Board, speaking at the inquiry into the claim for protection and assistance to the Indian plastics industry. For the industry to be sound it must be freed from dependence on imported raw materials, he said.

"It should be our ambition," Mr. Mehta said, "to produce plastics by developing our own resources and technique." Sixty firms were at present engaged moulding plastic goods in India, but not all of them were well organised, or even in full production, according to the speaker.

The Government of India, he added, had taken a keen interest in the development of the plastics industry. As evidence of this, he mentioned the proposed central factory for the manufacture of moulding powders, and schemes to develop natural and synthetic resins under the auspices of the Council of Scientific and Industrial Research.

EDUCATION FOR CHEMICAL INDUSTRY

Academic and Technical Qualifications Compared

THE methods by which those intending to enter chemical industries can obtain degrees and academic qualifications were discussed at length at a joint meeting of the London and South Eastern Counties section of the Royal Institute of Chemistry, the London section of the British Association of Chemists, and the London area branch of the Association of Scientific workers held recently in London.

The proceedings took the form of a symposium on "Part-Time Education in Chemistry," and the chair was taken by Mr. H. L. Howard, chairman of the BAC.

The first speaker was Dr. P. C. L. Thorne, who took as his subject "Organisation and Official Encouragement." Dr. Thorne said there were in the chemical industry a number of potential "degree" men who, for reasons beyond their control, had been unable to proceed to the university. If such men wished to qualify in the profession of chemistry, they were obliged to obtain their qualifications by means of part-time education.

Normally, a man embarking on a course of part-time study would enrol at his local technical college for evening classes in the appropriate subjects. In some cases his employer would allow him time off for the purpose of attending classes during the day. Part-time releases of that kind were of benefit to both the student and the college authorities; to the student because it enabled him to attend classes during the day when he was fresh, and to the college authorities because it enabled them to relieve the evening congestion in classroom and laboratories.

Qualifications Obtainable

Provided he possessed the necessary ability, a student was able, through part-time education, to proceed to any qualification in the chemical profession, *e.g.*, national certificate, City and Guilds certificate in chemical technology, A.R.I.C., and the external B.Sc. degree of the University of London.

The education authorities took an active interest, in addition to providing financial assistance and advice to local technical colleges.

Dr. Thorne was followed by Dr. H. J. Barber, speaking on "Industrial Schemes," who said that 20 years ago all part-time education was done in the students' spare time; there was no large-scale organised support for the part-time student.

In recent years many factors had operated both for and against the part-time student. The expansion in chemical knowledge had resulted in examining bodies increasing their syllabuses. On the other hand, many firms now worked a five-day week and allowed students up to a whole day per week leave of absence to attend classes. In some cases financial assistance was also given.

Fight Against Odds

From a survey of present conditions, it appeared that, despite concessions by employers, fewer students were winning through to good degrees. The part-time student was fighting a gallant but losing battle against an overwhelming force of circumstances, and there seemed to be little that industry could do to help him. It appeared that the A.R.I.C. rather than the degree would be a better target for the part-time student to aim at, but even so the difficulties were still considerable.

To obtain a solution to the problem, it might be necessary to re-examine the requirements of the chemical industry. There appeared to be a need for skilled technicians in laboratories to develop the new techniques which emerged from fundamental research. The function of the research chemist and the skilled technician were complementary, and an insistence on young men studying for academic degrees, with a tendency towards more theory and less technical skill, might result in the chemical industry lacking skilled practical men able to develop new discoveries.

In one organisation a grade of laboratory technician had been instituted and sub-divided into apprentices, technicians and senior technicians. Technicians did not receive leave of absence to follow a degree course; some were studying for A.R.I.C. and some were receiving training in laboratory arts.

Nothing had been said so far about the technical diplomas issued by technical colleges to replace university degrees. A further development of such diplomas would be valuable to the chemical industry. It might appear to some that there was no future for the young chemist un-

less he could obtain a degree or similar professional qualification. On the other hand, it must be realised that at the present time society was re-valuing most of the services and duties which its members performed, and the old qualification labels would tend to lose their significance.

The dominant factor in the future would be the capability of a man to do a job, and it would be increasingly recognised that the practical technician made a contribution comparable with that of the theoretical chemist and should receive a salary, working conditions, etc., compatible with such a status, concluded Dr. Barber.

Methods of Study

Dr. K. G. A. Pankhurst then spoke on "The Student's Viewpoint," saying there could be no doubt that a full-time course was the best method of studying for a degree in chemistry and that part-time study could not be more than the second best. A student embarking on a degree course would probably do so for two reasons: first, to gain admission to the profession, and second, for economic reasons since, other things being equal, the degree man could command a higher salary.

Participation in part-time courses might be attributed to the economic necessity of earning a living in the absence of financial backing to permit full-time attendance at a university, or to the fact that the student had not a "scholarship brain" which would win a free place in the university.

Formerly, evening classes used to be merely intensified versions of full-time courses, with the result that practical work was often skimped and insufficient time given to learning technique. With part-time day releases, longer periods in the laboratory might be possible and the differences between day and evening classes reduced.

In some instances the student could overcome difficulties by strict attention to detail, and by developing an inquiring mind and not being satisfied merely with a "digest" outlook. A part-time student's college activities were likely to be confined to attendance at classes with little opportunity to meet his fellows and discuss subjects other than chemistry. This led to a narrow outlook. Having acquired his degree, the minimum requirement for entry into the profession, the student had also to learn to mix with his fellows. This he could not do successfully if his training had made him narrow minded and unable to discuss anything other than "shop."

Dr. Pankhurst was followed by Dr. A. M. Ward, who spoke on "Qualifications and Their Status." Dr. Ward said that of the qualifications open to the part-time student of chemistry—the external London B.Sc., A.R.I.C., City and Guilds diplomas, and the national certificate—the last was for some inexplicable reason, not valued at its true worth by chemical industry, particularly in the south of England. Perhaps interest in that qualification would be revived if it were made a definite step towards the A.R.I.C.

The City and Guilds diplomas in technology, while enjoying a somewhat fuller recognition than the national certificate, were not rated as highly as an academic degree. That might be attributed to a reluctance on the part of chemical industry to view the matter in the proper perspective and obtain the true balance between theoretical chemistry and technical skill. In that connection the comments of Dr. Barber were particularly significant.

At the present time, the A.R.I.C. and the university degree were held in approximately equal status. However, that position might change in view of the proposed changes in the London B.Sc. degree. Not only were those changes likely to alter the character of the degree, as compared with the A.R.I.C., but the extended syllabus might deter many from tackling the degree by part-time study and lead to an increase in the number of students offering themselves for the A.R.I.C.

In considering the whole question of qualifications and their status, it must be realised that, while some students were capable of obtaining the highest possible qualifications, others, due to a limitation of their natural talents, had to be content with a more modest qualification. Clearly, if the latter class of chemist was to serve a useful purpose in the community, revision of the status attached to the various qualifications was necessary.

Technical Aspect

At this point Mr. H. L. Howard relinquished the chair to Dr. J. G. A. Griffiths and spoke on "Chemistry and Technology." Mr. Howard said, in technology, as distinct from science, it was the technological subject which was the main subject and the science subjects were the ancilliaries. To technologists lacking a good scientific background it was essential to present the technology from the practical angle at the outset and so maintain interest, while unobtrusively building up the scientific background.

This could be done by starting from the

finished article and working backwards to its components, the components then being studied in more detail, so that by the time the more involved studies were reached, the necessary background had been provided. Thus, while the national certificate in chemistry might be regarded as a definite qualification in chemistry, it was to the City and Guilds diplomas that one looked for the competent technologist.

It was often forgotten that, where the ancilliaries might appear inadequate by other standards, the necessary scientific background was of necessity incorporated in the technological instruction, so that the training received would be of a much higher order than might be construed from reading of the regulations.

In recent years an extension of national certificates to applied science required a mere three evenings—one in each of the last three years of a five-year course—in technology, and those were obtained at the expense of three evenings' science provided in the national certificate in chemistry. That was quite inadequate to cover in an effective manner any technology, and the successful candidate would be neither chemist nor technologist.

Training and Status

Another aspect which was causing grave concern was the failure to provide equivalent status at definite stages in training as between University, national certificate or City and Guilds studies. It should be possible to switch without having to go back to the beginning. That might easily be done where the student decided to drop a university course in favour of a less onerous training, but was often not possible in the other direction.

It should be possible to obtain credit on a subject for subject basis at the matriculation, intermediate and subsidiary subject stages or their equivalents, so that a student switching from technology would not be debarred from university training merely because he had not passed matriculation at the outset. It was also wrong to encourage students to take national certificates in chemistry, only to find that they were debarred from proceeding to the A.R.I.C. or a degree, or even to find that they were not regarded as competent chemists or denied the status of chemists.

Mr. Howard appealed to the Ministry of Education and the Royal Institute to give careful consideration to this aspect, especially in so far as it affected students' right to acceptance by the Central Technical and Scientific Register.

Again, there was a marked tendency in connection with apprenticeship schemes and for various technical bodies to draft syllabuses for "special ancilliary subjects," containing only the minimum science applicable to a particular technology. Those differing syllabuses necessitated separate classes, and being so one-sided would not be acceptable in lieu of "straight" ancilliaries of the national certificate type.

Encouragement Needed

Mr. Howard advocated "straight" ancilliaries as being more beneficial to the student and providing that sound scientific background which was so essential to the technologist.

In the course of the discussion which followed the talks, Mr. Newland pointed out that in the past there were plenty of chemists on the labour market, but to-day the position was reversed and employers had often to train their own staff. If young men coming into the chemical industry were not encouraged to take a degree, industry would suffer. Even if industry paid attention to that point, difficulties might arise unless the right type of man were engaged.

What steps should be taken to train the university graduate who possessed no technological background? If he were advised to take up one of the City and Guilds courses, said Mr. Newland, he might be disappointed and fall back on the textbook. Such a step would be a loss to industry.

Was it considered necessary for apprentices to undertake part-time education, and if so, what courses should they take? What was the difference between the standard required for matriculation and the new examination which had replaced it?

Mr. Howard, replying, said he thought that when a new graduate came into industry it was a good plan to let him see over the works and study the plant and processes. Admittedly, any course such as the City and Guilds diplomas might prove disappointing to a graduate in the early stages, but the student must give the lecturer a fair hearing and allow him to develop his subject as the course proceeded.

Apprentices

Where a firm had a sufficient number of post-graduate students requiring special instruction, it was usually possible to get a suitable course provided. With reference to training apprentices Mr. Howard advocated a policy of starting with the technological aspects of the subjects and leading up, from that, to the scientific background.

Dr. Ward, replying to Mr. Newland, said he considered that it was the function of the technical colleges to provide courses of instruction, but that it was up to industry to provide the instructors by allowing its trained technical staffs to lecture in the technical colleges. On the subject of matriculation and the new general certificate of education, he admitted that care was needed when interviewing a candidate who offered the new certificate. It was advisable to scrutinise the subjects taken in the examination to ensure that the candidate had reached the necessary standards in the subjects which the employers considered to be required for the post.

Mr. Martin, referring to the potential "degree men" who had entered industry before acquiring university honours, questioned whether it was worth their while to continue studying for a university degree in view of the proposed increase in the syllabus.

More Time Required

Mr. McLachlan, speaking on the opportunities open to the part-time student, reminded the meeting that the only candidates for a recent public appointment were all part-time students. However, in view of the increased syllabus that was proposed, he considered that more time should be allowed for the courses and suggested that National and higher certificates should be made stepping stones to professional qualifications such as the A.R.I.C.

Mr. Miall drew attention to the fact that up to the present the university degree and the A.R.I.C. had been generally accepted as equivalent qualifications. However, the new university regulations were likely to change this and produce differences in status between the two qualifications. Were chemists, he asked, going to accept this as inevitable? He suggested that the chemical organisations should consider the question very carefully and try to persuade the examining bodies to adopt a more equitable policy towards the part-time student.

The General Degree

Dr. Wilkinson pointed out that little mention had been made of the London general degree. There was undoubted scope for people with this degree. For instance, in chemical pathology a man holding a general degree was in a strong position, and he thought the discussion on the special degree had tended to cloud the position. He thought that candidates for the special degree who were disturbed by the new regulations should take the general degree.

Mr. Freeman considered that the effect of the new regulations might be to influence some students to sit tight, to take no examination at all and then, having reached the age of 30 and achieved a relatively important position in industry, to apply for the A.R.I.C. He considered this to be an unsatisfactory state of affairs.

Mr. Collett said he did not intend to express the official view of the Royal Institute of Chemistry, but he would like to put forward an idea in connection with the difficulty of organising courses. In large colleges the overloading of courses generally took place in the earlier years, while in the smaller colleges, probably more convenient to the student for geographical reasons, it was difficult to get teaching staff.

He thought it was possible for the smaller colleges to deal with the students in their earlier years so that they could be passed on to the larger colleges only for the later years of the course.

Commenting on the "tired mind" of the part-time student, he considered that in many cases this was due to the student failing to connect intelligently the theoretical instruction he received in the evening with the works experience he was gaining during the day. On the vexed question of new university regulations, he thought there was a real danger of students becoming discouraged by the piling on of new requirements for the degree examination. At the same time, he warned students against falling into the trap of regarding the A.R.I.C. as a "soft option" if the degree seemed impossible.

Welding Prize Competition

SIGNALISING the 30th anniversary of its foundation, the Soc. La Soudure Électrique Autogène, S.A. Procedé "Arcos" of Brussels, has announced an international prize competition, with three prizes of Fr.60,000, Fr.40,000 and Fr.25,000 and five subsidiary awards of Fr.5000 each. It is open to all, without regard to nationality. The competition calls for a thesis on a branch of welding, *e.g.*, metallurgy of arc welding, nature and properties of the electric arc in air or other atmosphere, study of strains or deformations in arc welding, properties of electrodes and various modes of use. Papers must be in French or have a French translation, and a 20-line abstract of text. They should reach the Chambre de Commerce de Bruxelles not later than May 1, 1950.

Technical Publications

FINE chemicals of high purity and reagents to meet exacting standards are more than ever in demand today. The issue of the new catalogue of laboratory chemicals and testing outfits by The British Drug Houses Ltd., fortunately, coincides with an encouraging improvement in reagent supplies. Among the new features of the catalogue is a section devoted to amino acids which are now being made in substantial quantities. Full details of concentrated volumetric solutions are given, and an extended series of special indicator papers with colour standards for *p*H determination has been introduced.

* * *

SECTIONS on glycerine and some glycerine derivatives from Beilstein's "Handbuch der Organischen Chemie" (Handbook of Organic Chemistry), 4th edition, published and copyrighted in 1918 have now been translated into English. The German interests in this work were vested in the U.S.A. in the Alien Property Custodian in 1942, 1943, and 1946. The translation was made by a board of three translators and five editors from the staff of the research laboratories of the Glycerine Producers' Association, New York, under licence. The book (210 pages) is thoroughly indexed and covers the glycerine aspects of the literature to 1910 in the main work, 1910-19 in the first supplement and 1920-29 in the second supplement volumes 1-6. This edition is available at $2.50 per copy from the Glycerine Producers' Association, 295 Madison Avenue, New York, 17.

* * *

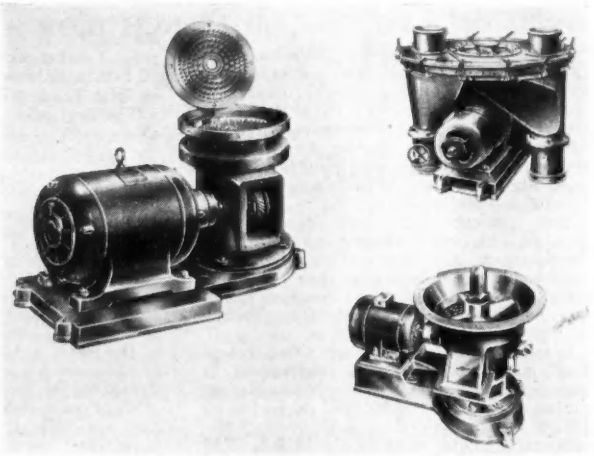
A NEW mobile apparatus of low power for heat treatment of small parts has been devised by Phillips Electrical, Ltd. This model, type F.5, a 2.5 kW high frequency generator is described in the company's latest catalogue now available.

* * *

THE wide range of chemical products now handled by the Jan de Poorter organisation, of London (12 Cheapside, E.C.2), Brussels and Rotterdam, is shown in its newly issued directory of materials in English, French and Dutch.

* * *

A POTENTIAL stimulator to sales from this country to Europe and South America is "The Directory of British Rubber Manufacturers and Products" just issued by the Federation of British Rubber Manufacturers' Association. The directory is in English, French, and Spanish. It comprises an index of manufacturers giving their works and office addresses and overseas agents; list of products and their manufacturers; a section devoted to the tyre industry; index of trade marks and trade names, and a section of advertisements.



These grinding, blending and emulsifying mills, which are competing favourably in world markets, have a high speed centrifugal action. Materials are kept cool and clogging is prevented by the inflow of air and fanlike action of the rotary disc. Simplicity of construction allows quick and easy clearing (Kek, Ltd.)

Rising Scale of French Production

Most Chemicals Substantially Increased in 1948

FACTUAL evidence of the extent to which French chemical and allied industries have recovered from wartime disturbances is afforded by the official total tonnages recently released, which in most instances indicate that the production increases recorded between 1934 and 1947 continued at a proportionately higher rate in 1947-48. The only field in which the general tendency was reversed was, expectedly, that principally dependent on vegetable oils and fats.

The principal totals for the three years (in 1000 metric tons) were these:—

	1948	1947	1938
Crude tars ...	419	390	519
INORGANIC			
Sulphuric acid ...	1,257.2	1,061	1,272
Ammonia ...	188.2	167.5	222
Calcium carbide	170	147.6	156
Caustic soda (solid)	715.2	593.3	480
Electrolytic soda (solid)	186.2	169.3	114
Chlorine, gas ...	64.4	57.7	46.8
Sulphur ...	76.5	79.5	99.6
Copper sulphate	64.9	72.5	81
Arseniates ...	11.3	10.5	4
Sodium silicate ...	30.5	20.1	15.5
Chromium bichromates and sulphate ...	2.8	2	1.2
Sodium sulphate	58.9	48.2	60
Hydrochloric acid	130.6	104.3	120
Carbon disulphide	25.3	18.3	9.6
Borax	8.6	9.2	4.8
Iodine	0.02	0.026	0.048
Oxygen (cu. m. 1,000)	48,000.0	42,439.4	22,200
FERTILISERS			
Superphosphates	1,620.5	1,415.5	1,368
Compound ...	905.1	896.1	1,373
Compound ...	905.1	896.1	1,373
Nitrogen ...	163.6	131.7	188.4
Ground phosphates ...	247	251.9	150.0
ORGANIC			
Acetone	3.3	3.1	2.3
Ethyl acetate ...	2.5	1.8	0.96
Methyl alcohol ...	16.3	15.0	7.9
Formaldehyde ...	6.25	5.95	1.56
Butyl alcohol ...	1.7	1.75	1.03
Tricresyl- and trixylen - phosphates ...	0.4	0.356	0.072
Benzol products	61.23	52.4	75
Fatty acid condensation products	6.3	6.2	—
Synthetic phenol	7.74	6.9	8.8
Phthalic anhydride	2.05	1.7	0.7
Methyl chloride...	0.5	0.33	0.98
Ethylene-glycol...	0.45	0.6	—
Monoethanolamine ...	0.36	0.28	0.41
OILS, FATS, SOAPS, ETC.			
Toilet soap ...	14.4	12.28	16.4
Household soap...	100.7	77.76	229.25
Detergents ...	66.41	73.03	90.48
Shaving preparations	1.79	2.14	0.98
Industrial soaps and misc. ...	32.36	13.95	93.12
Stearine	3.43	2.02	11.73
Oleine	3.5	2.2	0.95
Other fatty acids	14.0	17.0	19.5
Distilled glycerine	5.43	2.79	6.7
Sapon glycerine...	1.64	1.67	1.98
Candles	2.14	2.81	8.96
Lithopone ...	14.83	11.56	15.96
Salicylates	1.32	1.2	—
Dynamite	8.7	7.53	5.72
Nitro explosives ...	7.0	6.7	2.67
Chlorate explosives	1.14	1.28	2.13

DOLLAR AID FOR FRENCH IRON AND STEEL

THE likelihood of greatly increased production of French iron and steel and rolled products, which should ultimately provide a good margin for export, is associated with the recent approval by the ECA authorities in Washington of large development schemes, involving liberal aid from American funds (THE CHEMICAL AGE, 60, 592).

The project has been planned by SOLLAC (Societe Lorraine de Laminage Continu), a new entity organised and owned by eight Lorraine iron and steel companies and one Saar company, all under French management, with French majority ownership.

It is proposed to carry out the development and modernisation programme in two phases, the first of which would cost the equivalent of $62.82 million, including $29.82 million in ECA assistance for the purchase of equipment in the U.S.A. The second phase would involve an equivalent of $70.24 million, including $19.54 million in ECA funds for U.S.A. purchases.

The first stage is to be the construction of an 80-in. continuous hot strip mill with an annual capacity of 700,000 to 850,000 tons of coils, and the construction of a 5-stand, 48-in. continuous cold strip mill having an annual capacity of 350,000 tons of thin sheets and tinplate.

The second-stage proposes an 84-oven coke plant to supply existing blast furnaces at Hayange; new crude steel capacity of 500,000 tons per year; a new blooming mill to handle the requirements of the 80-in. hot strip mill; and a new continuous cold strip mill. These may be operating in 1952.

Sheet and tiplate are scarce in France and are still rationed, but controls have been lifted on most other steel items.

AMERICAN CHEMICAL NOTEBOOK

* * * * FROM OUR NEW YORK CORRESPONDENT

THE Celanese Corporation of America has developed a new process for the first large-scale production of low-priced paraformaldehyde in flake form, thus opening up the possibility of its use by the plastics industry and other consumers as a replacement for formaldehyde, of which 624 million lb. were used in the U.S.A. last year. The news is of particular importance to the thermosetting plastics producers, since it will afford marked advantages in reaction, storage, handling and shipping that may drastically change present production techniques and costs.

* * *

Paraformaldehyde is essentially formaldehyde in a polymerised form, with the important difference that it contains less than 10 per cent water, against a possible 63 per cent in commercial formaldehyde solutions. Hitherto there has been a limited market for paraformaldehyde because of a wide price differential between it and straight formaldehyde. The new Celanese chemical will sell for about 11 cents per lb. The 5 million lb. of paraformaldehyde made by other processes last year sold for about 24 cents per lb. The new product is more water soluble, less dusting in its flake form and is said to offer less variation in reactivity.

* * *

A new series of polythene resins for use as coating materials is now being produced in commercial quantities by E. I. Du Pont de Nemours & Co., Inc. Closely related to the Du Pont plastic, polythene, the new resins are highly resistant to chemicals and possess good electrical insulating properties at high and low frequencies. They are said to be tasteless, odourless, non-toxic and waterproof and to have very low vapour permeability. They are extremely light, of white, waxy appearance and can be prepared in flexible or brittle compositions. The resins are said to give papers a brilliance approaching that of a lacquer finish. They are essentially unaffected by long exposure to concentrated sulphuric, nitric, hydrochloric, hydrofluoric or acetic acids at room temperature, and are also fairly resistant to oxidising agents such as chromic acid or acid permanganate solutions.

A number of advantages are claimed for a new line of driers made from 2-ethyl hexoic (octoic) acid which is now being commercially produced. Their properties are said to include uniformity of composition; viscosity less than "A"; high stability of drier solution; drying power is equal to or better, and the solid content lower, than the naphthenate type of drier. The new driers are metallic soap solutions in a petroleum solvent. They are being marketed by the Witco Chemical Company, New York, which states that they are effective even under adverse conditions of high humidity.

* * *

An up-to-date list of standard samples issued or in preparation by the U.S. National Bureau of Standards, numbering more than 400, is now available free of charge from the Bureau's Publication Section, Washington 25, D.C. It relates to samples, comprising materials of certified composition such as metals, ores, and ceramics; high-purity hydrocarbons; certain high-purity chemicals; paint pigments for colour; oils for viscometer calibrations; melting-point standards; radioactive materials; and a number of reference standards, such as lamp, opacity, and reflectance standards. Representative uses of the Bureau's standard samples include the checking of chemical and instrumental procedures and the developing of new methods of analysis; calibration of spectrometers, spectrographs, *p*H meters, calorimeters, pyrometers, and polarimeters, and the establishment of uniformity in test methods.

* * *

Cold fog can now be dispersed by the same "seeding" techniques scientists use to convert clouds into rain and snow, according to Dr. Vincent J. Schaefer, of the General Electric Research Laboratory, Schenectady, New York, who is a pioneer in the modern attempts at weather control. Scattering small quantities of dry ice or similar particles in a supercooled ground fog will cause the water droplets to gather into ice crystals so heavy that they can no longer remain airborne, he says. In warm weather the ice crystals melt as they descend to the earth and turn into rain. Many careful quantitative research experiments, however, must be conducted before eventual success in this field can be expected.

ISOLATING THORIUM

U.S. Claims Improved Methods

LARGER production of relatively pure thorium, a potential source of atomic energy, is being facilitated by improved methods of extracting the element from the sands in which it is found. This prospect was held out by three analytical chemists who evolved the new methods, speaking before the second annual Analytical Symposium of the American Chemical Society last week. The chemists are Dr. Louis Gordon, of Syracuse University, New York, C. H. Vanselow, a Syracuse student, and Prof. H. H. Willard, of the University of Michigan.

Supplementary Fuel

Although they have been concerned only with the laboratory study of the chemistry of thorium, their findings can be applicable to isolating the element on a large-scale industrial basis.

Thorium itself cannot serve as a nuclear fuel, but it can be converted in the atomic pile into a form of uranium called uranium-233 which, like the better known uranium-235, is fissionable.

Number 90 in the periodic table, the element, was discovered more than a century ago by the great Swedish chemist Berzelius, who isolated it from thorite. Most thorium now used in industry is obtained from the mineral monazite, mined chiefly in Brazil, India, and Ceylon although it also occurs in the U.S.A.

Monazite Problems

Many of the recent investigations inspired by the element's atomic energy possibilities have been directed toward determining the thorium content of monazite sand, according to Dr. Gordon and his collaborators. Up to now, however, analytical chemists have discovered that most of their procedures for separating the element from monazite yielded thorium compounds which were extremely difficult to handle, the chemists said. They were particularly hard to separate from an accompanying liquid containing impurities.

"The gelatinous and very slimy product both clogged the filter mechanism and also retained considerable impurities within its voluminous confines," the chemists reported.

The new separation methods developed by Dr. Gordon and his associates for analytical purposes produce a granular material similar to ordinary table salt.

U.S. SCIENTIST CHOSEN

Leader of Indian Research Group

THE appointment has been announced in India of Prof. James W. McBain, professor of chemistry at the U.S. Stanford University, as director of the National Chemical Laboratory now under construction in Poona. Prof. McBain, who is now in India on a preliminary four-week tour, hopes to take up his appointment from October, 1949, for a three-year period. The National Chemical Laboratory will begin functioning early in 1950.

The laboratory is intended to bridge the gulf between universities, the State and other scientific institutions on the one hand and the chemical industry on the other. It will assist group research and will also initiate fundamental research of its own. The laboratory will have a special interest in research to promote the fuller use of Indian raw materials.

Prof. McBain will have under him seven assistant directors for the fields of (1) inorganic and analytical chemistry, (2) physical chemistry including electro-chemistry, (3) organic chemistry, (4) chemistry of high polymers, (5) biological chemistry and biological evaluation, (6) chemical engineering and (7) survey and intelligence. The laboratory will have in addition to these directors, 11 research officers and a total staff of 310.

Prof. McBain, a Fellow of the Royal Society, was awarded the Davy Medal in 1930. He is a member of the American Chemical Society and has served as chairman of its Californian section and has been an officer of numerous other scientific societies.

New Mineral Sources

RESERVES of manganese ore have been discovered at Tirodi, in the Balagah district of the Central Provinces of India, by members of the Geological Survey of the Government of India. Investigation was undertaken at the request of the Central Provinces Manganese Ore Co., which has for some time past been engaged in mining operations in the area.

Other discoveries reported by members of the Geological Survey of India include: several large deposits of bauxite in the western part of Sambapur in Orissa; occurrences of magnesite near Ulipuram in the Salem district of Madras; and seams of coal on the west bank of the river Halso in the Bilaspur district in the Central Provinces.

HOME

£250 Gift

Imperial Chemical Industries, Ltd., Nobel House, S.W.1, has contributed £250 to the Forces Help Society.

Chemical Workers' Wages

An increase of 1½d. an hour has been agreed to for all male and female time workers aged 18 and over in the heavy chemical and fertiliser firms conforming to the decisions. These rates do not apply to the I.C.I. groups.

Licences Unnecessary

The existence of more plentiful supplies has persuaded the Ministry of Food to discontinue the licensing system for the manufacture of cod liver oil. The Cod Liver Oil and Veterinary Oil (Control) Order has been revoked as from July 1.

Aluminium for Bridge Building

The large-scale use of aluminium is contemplated for the new dock bridge at Aberdeen. It is proposed that movable parts of the bridge should be in aluminium and the permanent sections in steel. Only one previous bridge has used this combination.

Spanish Trade Prospects

Although satisfactory results have been reached in the trade and payments discussions between this country and Spain, it is not expected—says the Board of Trade—that a higher level of British exports will be reached until the usual rise in Spanish exports in the autumn makes available more sterling

Double Fatality

A man and a youth were gassed at the works of Millom and Askam Iron Company, Millom, Cumberland, on 3 July. Employed as a foreman erector and as an assistant gas plant attendant, they were at work on the gas plant when there was a rush of gas. They were overcome by the fumes and died almost immediately.

Coal Output Below Estimate

Production of coal for the first half of this year showed only a 2½ per cent increase over last year. Improvement at this rate would be little over five million tons, which is nearly two million tons less than the lowest assumption, while the main holiday season is yet to come. Actual figures were: deep-mined, 102,454,700 tons; opencast, 6,221,000. Last week's total output was 4,215,300 tons, compared with 4,320,200 tons the previous week.

Welders' Meeting

The annual meeting of the Institute of Welding will be held at the Institution of Civil Engineers, Great George Street, London, S.W.1, at 2.30 p.m. on Wednesday next week.

Textile Institute's 4800 Members

The Textile Institute announces that more new members have joined the Institute so far this year than in any corresponding period in previous years. In the first six months of 1949, 465 were enrolled. The total membership is now 4800.

Chemical Society's Library

The library of the Chemical Society will be open from 10 a.m. to 5 p.m. daily, July 6—September 30, inclusive, except during the first fortnight in August, when it will be entirely closed for revision and cleaning.

Paper Control Changes

A number of changes in the conditions of paper control including a reduction by £5 6s. 3d. per ton in the price of lightweight newsprint were notified by the Board of Trade. Some types of pulp board and similar grades are released from price control.

New Address

The British Chemical Ware Manufacturers' Association Ltd., announces that its new address is: 17 Manchester Street, London, W.1, to which all communications should now be sent. Telephone: Welbeck 0161-3. Telegrams: Glasmanef, Wesdo, London.

Improved Air-Mail Service

Since July 1, second class mail for Canada (including Newfoundland), the U.S.A., and Mexico may be sent by air mail at the reduced air postage rate of 4d. per half oz. This new service will apply to printed papers, commercial papers, samples, and literature for the blind. Small packets may also be sent by this service to the U.S.A. and Mexico.

Dyestuffs Workers' Memorial

Mr. G. B. Jones, general works manager of I.C.I., Ltd., Dyestuffs Division, Dalton Works, Huddersfield, last week unveiled a new stone memorial plaque at the works entrance in remembrance of 22 employees who died on active service during World War II. Canon Frank Woods, the Vicar of Huddersfield, conducted the dedication service in the presence of a large attendance of workers.

· PERSONAL ·

MR. O. V. S. BULLEID, C.B.E., M.I.Mech.E., has been elected president of the Institute of Welding for 1949/50, and MR. C. S. MILNE has been elected vice-president. Mr. Bulleid, who is about to retire from his present post as chief mechanical engineer, British Railways, Southern Region, has been appointed consulting mechanical engineer to the Irish Transport Company (Coras Iompair Eireann). Mr. Milne is founder and head of C. S. Milne & Co., Ltd., Deptford.

The following changes in the board have been announced by Stemco, Ltd., London. MR. B. T. W. BURGESS has been elected chairman; MR. S. COLLIER appointed managing director; and MR. E. S. STOCK and MR. A. R. SPELLER elected directors. The resignation is also reported of MR. D. C. JAMES, MR. R. W. MOGFORD, and MR. D. A. SHEPARD. Mr. James has resigned because of his increasing duties as European representative for both the Atlas Supply Co., and the Gilbert and Barker Manufacturing Co. Mr. Mogford has done so in order to devote his full time to white oils and specialities in Europe on behalf of the marketing co-ordination division of the Standard Oil Co. (New Jersey). Mr. Shepard, as reported last week, becomes executive assistant to the president of the Standard Company.

The view that higher technical education, despite all the publicity given to it, was at the cross roads, and that the next ten years would be critical, was expressed last week by PROF. W. M. CUMMING at a farewell party given by the staff of the Royal Technical College, Glasgow. A silver tea service was presented to the professor, anticipating his coming removal to the British Dyewood Co. Ltd.

MR. W. J. DRUMMOND has been appointed chairman of the North-Western Divisional Board, National Coal Board, in succession to Alderman J. A. Webb, who has relinquished the chairmanship for reasons of health. Mr. Drummond, who is 58, was managing director of the Ashington Coal Company and is a member of the advisory council of the Department of Scientific and Industrial Research, of the Geological Survey Board, and a number of other bodies.

DR. DONALD BURTON has accepted the office of hon. treasurer of the International Union of Leather Chemists' Societies in place of MR. W. R. ATKIN (resigned).

MR. GORDON WATSON DOUGLAS has been appointed director of research of the Australian Leather Research Association.

MR. ANTHONY J. WADE, who has recently returned from the U.S.A., where he has been making a comprehensive study of American methods of electrical ceramic manufacture, has been appointed joint managing director of George Wade & Son, Ltd., High Street, Burslem, Stoke-on-Trent.

The board of Bamag, Ltd., has been strengthened with the purpose of widening the company's activities. The chairman of the new board is LORD BROCKET and the other new members are MR. EOIN C. MEKIE, MR. ALFRED W. NEWBERY, and DR. M. STEINSCHLAEGER. Mr. B. Bregman and Mr. T. E. J. Hillman, who have been associated with the company for many years remain on the board.

MR. N. F. PATTERSON, works manager at the Ruabon plant of Monsanto Chemicals, Ltd., has been appointed general manager of production. Mr. Patterson is a member of the Welsh Board for Industry, and chairman of the North Wales district committee. The new works manager is DR. W. A. HAYWARD, formerly production manager at Ruabon.

Chemical Trade Golf

Many firms engaged in the chemical industry were represented in the Chemical Trade Golf Competition held recently at Sandiway.

G. T. Whitehead (handicap 4) won the Sir John Brunner Challenge Cup with a net score of 70. The scratch prize was won by W. C. Welsh with 73.

The Rayner Memorial team prize was won by the team of Synthetic Ammonia and Nitrates with an average of 78.5. A. T. Dewar and W. N. Gill were the winners in the afternoon foursomes competition with a score of 2 up on bogey.

In the evening the competitors dined at Winnington Hall Club at the invitation of the directors of the Alkali Division of Imperial Chemical Industries, Ltd. Mr. W. M. Inman, Alkali Division chairman, presided and presented the prizes.

OVERSEAS

Higher Swedish Iron-Ore Shipments

During the first quarter of the current year, Sweden exported 2,021,000 tons of iron-ore, as compared with 1,812,000 in the same period of 1948.

Austrian Nitrate Record

The Linz Nitrogen Works is reported to have produced nearly 27,000 metric tons of ammonium nitrate in May, the highest output registered. Exports totalled 40,000 metric tons.

Austrian Steel Works' Record Export

The Schöller-Bleckmann steel works, Austria, are reported to have exported in May products valued at 12 million Austrian schillings. This figure establishes not merely a new post-war high, but exceeds also the average for the years 1920-38.

Swedens' First Electric Open Hearth

The first electric open-hearth furnace, forming part of the new steel plant of the Fagersta Works, Central Sweden, has lately been brought into operation. It has two giant 120,000-volt transformers and takes eight tons of scrap daily. A further plant to be completed at Fagersta next year, will cost Kr.20 million (about £1.38 million).

Free Disposal of Cocoa Beans

The international allocation of cocoa beans has been terminated by the International Emergency Committee of the FAO Council. This decision, which had effect on June 9, was based on the recommendation of the IEFC Committee on cocoa which had its headquarters in London. The committee was satisfied that current supply of cocoa beans is sufficient to meet effective demand.

French Ammonia and Fertilisers

The Société Industrielle et Financière de Lens is to extend its ammonia production capacity by constructing a second nitric acid plant and at the same time will proportionally increase its nitrate production. The company's report for 1948 shows that conditions were normal until October when, as a result of the strikes, there was a prolonged interruption in gas supplies which led to the loss of equivalent of two months' production. By the end of the year production had again resumed a satisfactory level. The price of fertilisers rose considerably in January and in October, 1948, and there is no immediate prospect that supply will outpace demand.

D

Hungarian Scientific Institutes

An institute of agricultural chemistry and an institute of forestry are to be established, according to a recent decree of the Hungarian Government.

New Dutch Fibre

Dutch textile experts are reported to have developed a new fibre from wool and nylon, called "Nylotex." Materials woven from this are said to be specially strong, crease-free and almost unshrinkable.

Standard Oil in Israel

The Standard Oil Company, of New Jersey, is to become a regular supplier of oil and oil products on the Israel market through a subsidiary company acquired last year, A. I. Mantacheff & Co., which has been operating mainly in Egypt, and to a smaller extent in Palestine.

Rhodesian Chrome-Ore

Chrome ore mined in Southern Rhodesia was largely increased in March as compared with February, output rising to 20,562 tons (valued at £75,518) from 16,101 tons (valued at £56,951). Total production for the first quarter of the current year did not, however, reach last year's level; 56,136 tons (£198,294) compared with 64,771 tons (£205,398).

U.S. Dutch Collaboration

A licensing agreement has, according to the *Algemeen Handelsblad*, been concluded recently between the Mechanite Metal Corporation (a U.S. firm) and the Globe-Ijzerindustrie, Tegelen, Limburg, Holland, under which the Dutch firm will be permitted to apply a patented process for the manufacture of high-grade cast iron, having a considerable degree of malleability.

Co-operative Research

Increasing co-operation with the Netherlands is one of the features noted in the annual report of the Belgian Institute for the Promotion of Scientific Research. While Dutch experts have been engaged in research on the establishment of steel quality coefficients at the Belgian Institute for Welding Technique, considerable sums were allocated to the Centre National de Recherches Metallurgiques. Department Henegan, for microanalytical investigations of steel and work on blast furnace control. The quality of barley and other products required for brewing are being investigated in collaboration with the Dutch Nacobrouw Institute.

New Synthetic Fibres

TWO new synthetic fibres, one derived from cottonseed protein, the other from chemically modified cellulose, have been produced experimentally by Government scientists at a U.S. Bureau of Agriculture and Industrial Chemistry's research laboratory in New Orleans, Louisiana.

The cottonseed-protein fibre is about 75 per cent as strong as wool when dry, feels soft to the hand, and has good dyeing characteristics. Its natural colour is yellow or light orange.

The second synthetic fibre is spun from sodium carboxymethyl cellulose (a soluble compound made from wood or cotton cellulose) and the salts of certain metals, including lead, copper, and aluminium. It is colourless or lightly tinted, depending on the metal used, and will dissolve in soapy water or other weak alkali solutions.

The metal-carboxymethyl-cellulose fibres are expected to find uses similar to those of the alginate fibres (made from alginic acid, a constituent of seaweed) now being produced in England, which are also soluble in weak alkali solutions. Alginate fibres have been found suitable for use as a spacing agent—to provide the so-called "missing threads"—in specially woven fabrics.

In the production of fibre from cottonseed protein, the process depends on a special acid treatment applied to the protein obtained from solvent-extracted cottonseed meal having a low oil content. The acid treatment is necessary because of the complex chemical make-up of the protein. Methods that are highly successful in preparing fibre from soya bean, peanuts, and other vegetable protein sources fail to produce cottonseed protein dispersions that can be spun. The new process changes the structure of the protein, corrects its tendency to jell or lump in untreated dispersions, and makes it suitable for spinning. So far as is known, this process, covered by U.S. Patent No. 2,462,933, is the first for treating cottonseed protein for this purpose.

In making metal-carboxymethyl-cellulose fibres, a solution of sodium carboxymethyl cellulose in water is extruded through a spinnerette into a bath containing the salts of one or another of several heavy metals. The possibility of spinning useful fibres in this way was discovered at the Southern Regional Research Laboratory during studies to increase the absorbency of cotton.

Parliamentary Topics

IN the House of Lords, Viscount Swinton moved an amendment to postpone the operation of the Iron and Steel Bill until October 1, 1950. He explained that the amendment was consequential on the decision taken the previous week to postpone the vesting date from May 1 to July 1, 1950. Viscount Addison, Lord Privy Seal, agreed that the amendment was consequential and it was agreed to. Other amendments, which have been inserted after Government defeats include the establishment of an Iron and Steel Prices Board, and the substitution of the value of assets for Stock Exchange prices as the basis of compensation.

* * *

THE question of university status of technical colleges was raised in the House of Commons last week by Mr. Ralph Morley, who asked the Minister of Education which colleges, under the recommendation of the Barlow and Percy Reports, would be selected. Mr. George Tomlinson replied that it was not at present possible to give the names, but he was asking the National Advisory Council on Education for Industry and Commerce to hasten its consideration of this matter.

* * *

DISMANTLING of German plant was again the subject of questions in the House of Commons last week. Mr. T. C. Skeffington-Lodge asked the Secretary of State for Foreign Affairs why a licence had been granted and a sum of 17 million marks was alleged to have been expended on improvements to the factory of the Gelsenberg Benzin Co. in the British zone, when this establishment was scheduled for destruction. Mr. C. P. Mayhew replied that the licence was of a temporary character only for the reactivation of that part of the plant necessary to process 15,000 tons of natural oil per annum.

* * *

THE Secretary of State for Foreign Affairs replying to Mr. T. C. Skeffington-Lodge and other members on the plan submitted by Herr Arnold, the German Land Premier, for retaining the August Thyssen steelworks, said the matter would be considered, but the proposals contained in the plan appeared to conflict with the recent inter-governmental agreements on reparations and industrial disarmament.

* * *

THE British-owned oil refinery at Haifa is not at present functioning, but His Majesty's Government is anxious to further its return to normal activity.—Mr. Hector McNeil.

CANADA'S HEAVY CHEMICALS

Record Production of Some Basic Supplies

THE importance of the Canadian chemical industry to the welfare of the Dominion is reflected by the increase in 1948 of heavy chemical production to a value of $71.5 million, 20 per cent more than was recorded in 1947.

A survey of progress in the industry has recently been made by M. McLeod, chief of the Mining, Metallurgical and Chemical Statistics, Dominion Bureau of Statistics, in a series of articles in *Foreign Trade*, in which the following basic data was included.

An average of 6294 workers was employed in heavy chemical production last year. The new caustic soda-chlorine works of the Aluminium Company of Canada, Ltd., at Arvida, Que., and the glycol works of the Dow Chemical of Canada, Ltd., at Sarnia, Ont., contributed substantially to the gain in output. The latter plant produces ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, ethylene dichloride and dichlorethyl ether, all new products for Canada.

Mounting Yield of Acid

Sulphuric acid production in 1948 was the greatest on record, amounting to 679,448 tons of 100 per cent acid, of which about 75 per cent was used in the manufacture of fertilisers. Heavy chemicals, coke and gas, iron and steel, petroleum refining, explosives, textiles and metal refining were the other principal consuming industries in order of importance. The new contact acid plant of Canadian Industries, Ltd., at Hamilton, Ont., increased the capacity of the producing works to about 760,000 tons (100 per cent grade) yearly.

While complete details of production are not yet available, it seems likely that Canada's output of industrial and fine chemicals will total about $135 millions in 1948, subdivided by main classes (in millions) as follows: organic chemicals, $25; agricultural chemicals, $39; calcium compounds, $17; industrial gases, $16; sodium compounds, $12; acids, $10; and other chemicals, $16.

Imports of acids were valued at $3.3 millions in 1948. Carbolic, citric, stearic, tartaric, boracic, oleic, oxalic and chromic acids were the more important items. Imports of sodium compounds totalled $10.2 millions in value, principally phosphates, nitrate, glutamate, soda ash, caustic soda, cyanide, sodium base cleaning compounds, borax, chromate and bicarbonate.

The Canadian report recalls that production of fertilisers in Canada last year amounted to approximately 1,520,000 tons, comprising 650,000 tons of mixtures and 870,000 tons of nitrogen fertilisers.

Principally Nitrogen

The tonnage of superphosphates and other fertilisers in the over-all total was relatively small. During 1947 production amounted to 1,539,000 tons, of which 674,000 tons consisted of mixtures and 865,000 tons of nitrogen fertilisers. These include ammonium nitrate and calcium cyanamide, produced by the North American Cyanamid, Ltd., at Welland and Niagara Falls, Ont., ammonium sulphate, ammonium phosphate and ammonium nitrate, manufactured by the Consolidated Mining and Smelting Company of Canada, Ltd., at Trail, B.C., and Calgary, Alta., and ammonium sulphate recovered as a by-product from coke plants.

A factor revealing the very marked increase in output of mixed fertilisers in the Dominion is the comparison of the figures for 1920, 46,743 tons valued at $2,885,868, with the total of 650,000 tons valued at $22,332,000 in 1948.

Although volume of production was slightly lower than in the preceding year, the value of all fertilisers produced in Canada was 7 per cent higher than in 1947, amounting to $62.9 million, which compares with an output of $13.2 million in 1939.

Sales Record

Fertiliser sales in Canada were the highest on record, amounting to 672,171 tons for the 12 months ended June 30, 1948. While this represents an increase of only 2 per cent over the previous corresponding period, it is 100 per cent higher than in 1939.

Exports of fertilisers in 1948 amounted to $36.4 million, compared with a value of $34.4 million in the previous year. Shipments in the former year included 134,679 tons of phosphate fertilisers, 146,379 tons of ammonium sulphate and 411,081 tons of other kinds. About 75 per cent of the nitrogen fertilisers produced in the country last year was exported, shipments being made to over 50 countries.

Widespread Duty Exemptions

Chemicals and Instruments Affected by New Order

THE removal of Key Industry Duty from a wider range of chemicals than has been affected by any other recent exemption list is notified in an order made by the Treasury under powers conferred by the Finance Act. "The Safeguarding of Industries (Exemption) No. 5 Order, 1949," which is obtainable from HMSO (1d.), also makes some additions to the lists of chemicals concerned by earlier orders and replaces over 20 on the protected list.

The new exemptions are these:—

Optical elements:—
Analysers and polarisers consisting of a film of polarising material between glass discs or plates.
Magnifiers incorporating microscopic pictures.
Microfilm dutiable for its content of cellulose acetate.

Scientific instruments:—
Fermentographs for measuring and recording carbon dioxide evolved during dough fermentation.
Integrators (planimeter type).

Vacuum tubes:—
Sealed cylindrical X-ray tubes (four and two windows).

Compounds of rare earth metals:—
Celtium oxide, dysprosium oxide, arbium oxide, europium oxide, gadolinium oxide, holmium oxide, lutecium oxide, scandium compounds, terbium oxide, thulium oxide, ytterbium oxide.

Cerium sodium sulphate, crude.

Synthesis Products

Synthetic organic chemicals manufactured by fermentation processes:—
Acetamidosalol (acetylamido phenol salicylate), acid adipinic, acid butyric (normal), acid caprylic (*n*,octoic acid), acid diethyl acetic, acid dipropyl-malonic, acid filicic, acid formic (not less than 98 per cent), calcium ortho-iodoxy benzoate, acid maleic, acid malic, 2-ethyl hexoic acid, acid propionic, acid quinolinic, acid sebacic, acid succinic, excluding acid isosuccinic (acid methyl-malonic). Acyl derivatives of urea: Isoamyl ethyl barbituric acid, sodium ethyl methyl butyl barbiturate, sodium iso-amyl ethyl barbiturate, sodium propyl-methyl-carbinyl allyl barbiturate, alcohol amido-ethyl, alcohol butyl secondary, alcohol capryl, alcohol dodecyl (alcohol duodecyl), alcohol isopropyl, containing not less than 0.5 per cent by weight of ketones, alcohol octyl, secondary normal (2-hydroxy-n-octane), alcohol propylene, aldehyde butyric (normal), allyl paracetaminophenol, amido-guanidine sulphate, meta-aminophenol, amidopyrin (dimethyl-amido-anti pyrine), ammonium perchlorate, amyl alcohol (isobutyl carbinol, not less than 98 per cent), barium manganate, isobornyl thiocyanoacetate, butyl methyl adipate, 2-3 butylene glycol, cellulose acetate, where the weight of the acetyl content, calculated as acetic acid, is not less than 55½ per cent of the weight of the cellulose acetate, not being cellulose acetate which is an ingredient or forms part of a composite article, ethyl cellulose, chlor-nitrobenzol, ortho-, pentachlorphenol, cobalt arsenate, cocaine (crude).

Crystals, not optically worked, weighing not less than 2.5 gm. each, consisting wholly of one of the following: Barium bromide, B. barium chloride, barium fluoride, barium iodide, caesium bromide, caesium chloride, caesium iodide, calcium bromide, R. calcium chloride, R. calcium fluoride, calcium iodide, lithium bromide, lithium chloride, lithium fluoride, lithium iodide, R. magnesium oxide, potassium bromide, R. potassium chloride, potassium fluoride, potassium iodide, rubidium bromide, rubidium chloride, rubidium fluoride, rubidium iodide, sodium bromide, R. sodium chloride, sodium fluoride, sodium iodide.

Cumenol, pseudo-, methyl cyclohexanol methyl adipate, dichlor-hydrin, dicyandiamide, p-di-ethoxy ethenyl diphenyl amidine and its hydrochloride, diethyl amino-ethanol, diphenyl, diphenyl oxide, albon (cinnamoyl para-oxyphenyl-urea), epichlorhydrin.

Ethyl esters:—Ethyl abietate, hydrogenated ethyl abietate, ethyl acrylate, ethyl benzoyl-benzoate.

Ethyl phenyl-ketone (propiphenone), ethylamine, mono-, eukodal, furfurol, germanium oxide, glycol diabietate, glycol ethers, glycol ether esters (other than dibutyl glycol phthalate and dimethyl glycol phthalate), guanidin carbonate, guanidin sulphate, guanidine sulphocyanide, tetrahydronaphthalene, R. iron chloride, isophorone, iso-propyl-benzene (cumene, cumol), kryofin, laudire chloride (lauroyl chloride), lipoiodin, maleic anhydride, R. mannite (R. mannitol), menthyl ethyl glycollate.

Mercury compound: N-(oxy-adeto-mercuric-propyl)-ethylurethane.

Methyl ethyl ketone, methyl esters: hydrogenated methyl abietate, methyl abietate, methyl acrylate, oxymethyl para-oxyphenyl benzylamine methyl sulphate. Methyl-sulphonal (diethylsulphonemethyl-ethylethylmethane, trional), *a*-naphthyl isothiocyanate, nickel hydroxide.

Octyl esters: dicapryl phthalate, sodium dioctyl sulpho-succinate.

Organo-arsenic compounds: 4-oxy-3-ethylamino-phenyl arsinic acid N-methyl tetrahydropyridine *β*-carboxylic acid methyl ester.

Oxy-acetophenone, meta: phenetidine, ortho-: phenetidine, para: phenetidyl-phenacetin and its hydro chloride, phytin, piperazine (diethylene-diamine, dispermin), potassium ethylxanthogenate (potassium xanthogeante), R. potassium hydroxide, isopropyl hydrogen phosphate, safrol, sodium nitro-benzene sulphonate, sodium phenyl dimethyl pyrazoione amino methane sulphonate, sodium pyrophosphate, sodium triphosphate, penta-, styrol (stryrolene), succinic anhydride, sulphonal, theophylline, triecan-triamide, vioform (iodo-chloroxyquinoline), xenylamine, xylol, (meta), xylol (para).

Additions and Deletions

The order continues until December 31, 1949, the exemption from Key Industry Duty of all articles exempted by previous orders which expired on June 30, 1949, with these additions and deletions: Additions:—
Alcohol isoamyl (isobutyl carbinol) not less than 98 per cent; R. iron chloride: sodium triphosphate, penta. Deletions:—
R. acid carbolic, acid carbolic (synthetic), acid monol chloracetic, acid oxalic, acid phthane anhydride-alcohol butyl, normal, alcohol octyl (2-ethyl hexy, alcohol), R. benzo-phenol, benzo-phenol (synthetic), carbamide, cyclohexanol, cyclohexanol ester (dicyclo-hexyl phthalate), alkyl cyclohexanol ester (dimethyl-cyclohexyl phthalate), cyclohexanon, diethylamine (ethylamine, di-), ethyl ester (ethyl orthoformate), glycol ether esters (dibutyl glycol phthalate, dimethyl glycol phthalate), guanidin nitrate, methyl amidoxy-benzoate, methylene chloride, nitro-phenol (para-), octyl ester (dioctyl phthalate), R. phenol, phenol (synthetic), phthalic anhydride, sodium nitrophenate (sodium paranitro-phenol), triethanolamine, urea.

Israel's Potash

Collaboration of the U.S. Messer Chemical Construction Corporation is being given for the maximum exploitation of Dead Sea minerals, formerly worked by Palestine Potash, Ltd., the concessionaires. A yield of 70,000 tons of potash yearly is anticipated.

SCOPE FOR ENTERPRISE

Courtaulds System

THE comparative lack of opportunity for new enterprise in nationalised industries in contrast with the conditions prevailing in a free field is critically examined in the annual statement by the chairman of Courtaulds, Ltd., Mr. J. C. Hanbury-Williams. This is being circulated in anticipation of the annual general meeting on July 27.

"The system under which we and other so-called 'private' concerns operate is that of 'free enterprise,'" said Mr. Hanbury-Williams. "Our industry differs from the coal industry or the Post Office, in that anyone who can find sufficient people with money to back his ability is free to enter, whereas in nationalised industries it is a breach of the law to engage in them without licence from the Government monopoly.

"It follows that any person who thinks that he has discovered a new and better process, or product, or market, than we or any other existing undertaking in the rayon industry has discovered, is at liberty to commence business in our industry if he can find a sufficient number of people to take the same view. . . .

"The innovator may prefer to offer his project to us or to one of our existing competitors, but that does not alter the fact that he is free to do otherwise; with the consequence that we carry on our business in the knowledge that if we allow our productive efficiency to decline or fail to give the consumer what he wants at a price he is willing to pay, we invite competition and have inevitably to face it."

Adverse Balances

IT is by no means only nations that have to give out as well as take in. The rule applies to everyone. The man who is putting into the general pool of wealth the equivalent of £100 a year and taking out of that same pool a salary of £500 a year, is responsible for an adverse balance, quite as real and serious as the nation's present overseas deficit of £10 million a week. A round couple of million persons in the public employ should examine their own positions from this point of view. From the top to the bottom of this expensive Ministry (of Town and Country Planning) there is no one who can claim the credit for a pennyworth of export of any sort, kind or description, although together they consume some few millions of our impoverished imports.—SIR ERNEST BENN.

LAPORTE CHEMICALS

Group Earnings £583,336

THE 42nd annual report of Laporte Chemicals, Ltd., for the year ended March 31 shows a group profit of £583,336 (£433,278). Capital reserves now total £856,119 and revenue reserves £715,292. The directors propose a scrip bonus of 100 per cent. Consolidated current assets amount to £1,936,245 (£1,069,653).

In his address, the chairman, Mr. L. P. O'Brien, states:

As regards the future, undoubtedly there will be difficulties, but if we are left to manage our own affairs, we shall surmount them, and as far as one can reasonably foretell, the outlook is satisfactory.

Time to Speak Out

Hitherto, I have never referred to controversial matters, but on this occasion I feel impelled to do so. For many years your company has enjoyed good relations with the employees. Some of the employees belong to trade unions. How many owe allegiance to trade unions we do not know, but we believe it is a large number. We do not object to that situation, indeed, we recognise their position, and ourselves joined the Association of Chemical and Allied Employers so that, through the Joint Industrial Council, we could negotiate agreed rates of pay and conditions of labour. So far, so good, but now we hear that some trades union leaders are advocating the nationalisation of our chemical industry . . .

Your directors believe that nationalisation would work out disastrously for everyone concerned in our country, and meantime, while the threat is there, it will tend to destroy unity between employers and employees in chemical industry. It will deter from entering the industry the individual whom we wish to attract.

Developments in the British chemical industry are moving at a fast pace on a high scientific plane, and should not in normal peaceful times be hampered, as they would be, by bureaucratic control. Make it the business of everybody and it would become the business of nobody in particular, and progress would be retarded. It would follow that such matters as overseas developments, investments and patent applications would become matters of international bargaining.

In the circumstances, your directors feel that they should tell you that they reserve the right to take whatever legitimate steps seem reasonable to protect the interests of stockholders.

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

IBEX PETROLEUM PRODUCTS, LTD., London, S.W. (M., 9/7/49.) May 31, £2000 debenture, to D. M. B. Fitzgerald, London; general charge. *Nil. Dec. 9, 1947.

MODERN INDUSTRIAL FINISHES, LTD., Northfleet. (M., 9/7/49.) June 3, debenture, to Barclays Bank, Ltd., securing all moneys due or to become due to the bank; general charge. *Nil. Dec. 31, 1947.

PETROCHEMICALS, LTD., London, W. (M., 9/7/49.) June 3, £1,800,000 secured on loan stock, secured by a Trust Deed dated May 17, 1949; charged on property, agreement for lease and certain shares as specified in schedule to Deed, and a general charge. *£1,300,000. Feb. 22, 1949.

Satisfactions

BRITISH BURMAH PETROLEUM CO., LTD., London, E.C. (M.S., 9/7/49.) Satisfaction June 3, of debenture stock registered Feb. 25, 1936.

DELAWARE OIL CO., LTD., London. (M.S., 9/7/49.) Satisfaction June 9 of debenture registered May 5, 1941, to the extent of £40,000.

W. L. LAWLER (PLASTICS), LTD., Birmingham. (M.S., 9/7/49.) Satisfaction June 3, of charge registered Feb. 18, 1948.

MILLOM & ASKAM HEMATITE IRON CO., LTD., Millom. (M.S., 9/7/49.) Satisfaction June 8, £200,000, registered August 15, 1935.

New Companies Registered

Alkin, Ltd.

Private company. (469,932). Capital £2000. Manufacturers of chemical plant and materials and electrical, laboratory and scientific furniture; chemical manufacturers, etc. Directors: J. E. W. Alderson and T. Kinahan. Reg. office: 276 Manchester Street, Oldham.

J. H. & A. Cole, Ltd.

Private company. (470,370). Capital £50,000. Objects: To acquire the business of a fertiliser and manure manufacturer. Directors: A. Cole, L. G. Davies, J. Watson, Mrs. K. Cole and C. F. Cole. Reg. office: 102 Feeder Road, Bristol, 2.

Bonnikson & Gronk, Ltd.

Private company. (470,271). Capital £1000. Manufacturing chemists, etc. Directors: J. G. Cronk, D. H. Cronk. Reg. office: 26 Waterloo Road, Epsom, Surrey.

Unisol Chemical Products, Ltd.

Private company. (470,167). Capital £2000. Manufacturers of chemicals, etc. Directors: R. F. Tilley, A. J. L. Ridge, S. E. Moss. Reg. office: 79 High Street, Walton-on-Thames.

Company News

The name of MAURE CHEMICALS, LTD., 9 Arundel Street, W.C.2, has been changed to RICHARD H. KLEEDEN, LTD.

Chemical and Allied Stocks and Shares

STOCK markets opened the week cautiously, satisfaction with the outcome of the Paris monetary talks being overshadowed by the general tendency to await Sir Stafford Cripps' statement on the decline in our gold and dollar reserves and the reasons for the prevailing difficulties. At the time of writing, however, markets have steadied. British Funds have regained a small part of their recent heavy fall, and industrial shares appear to be taking their cue from gilt-edged.

Shares of chemical and allied companies have strengthened a little in some cases, with Imperial Chemicals at 43s. 9d., Fisons 44s., and Brotherton 10s. shares 20s. B. Laporte 5s. shares at 19s. have firmed up following the bonus news, and Albright & Wilson 5s. shares at 28s. 3d. kept steady, the decision of the latter company to postpone its big preference issue until general market conditions are more certain not coming as a surprise. Elsewhere, Amber Chemical 2s. shares were 6s. 3d. and Bowmans Chemicals 7s. Monsanto 5s. shares have changed hands around 30s. 7½d. Murex shares strengthened to 92s. 6d. in response to the decision to distribute a share bonus of 100 per cent.

Elsewhere, British Plaster Board 5s. shares rose to 21s. in response to the bonus and financial results which exceeded market expectations. Associated Cement improved to 72s. United Molasses firmed up to 37s. 6d., Dunlop Rubber to 62s. 9d., British Glues 4s. have been firmer at 17s. 9d.; while British Match rallied to

32s., the results coming as a pleasant surprise to the market. In other sections, Borax Consolidated deferred eased to 50s., British Aluminium were 43s. 3d. and British Oxygen 91s. 6d., after touching 90s. De La Rue rallied to 26s. 9d., while Lever & Unilever were 44s. 7½d. Turner & Newall improved to 72s. 3d. and Triplex Glass 10s. shares have been more active around 18s. 9d. partly on market talk of prospects of a bonus of some kind. Elsewhere, Tube Investments changed hands up to £5¾. British Xylonite were 66s. 3d., Ilford at 19s. 3d. were "ex rights" to the new shares. General Refractories were 23s. 4½d. and Amalgamated Metal shares 17s. 6d.

Iron and steels have at the time of writing also participated in the better tendency in markets. As in most other sections, this was due to the appearance of a few buyers and cessation of the selling in evidence in recent weeks. It is realised, however, that the main trend governing markets will be the reaction to Sir Stafford Cripps' statement on the implications of the gold and dollar losses suffered in the past three months; and these notes are being written before the Chancellor's speech. Nevertheless, iron and steel shares are being favoured on the ground that nationalisation may never happen. United Steel, Dorman Long, Colvilles and Stewarts & Lloyds have therefore participated in the better trend. In other directions Staveley were 77s. 6d. and Powell Duffryn have firmed up to 26s. 9d. Guest Keen rallied to 38s. 6d. and Babcock & Wilcox at 59s. 6d. have also regained part of the fall in price which followed the new issue news.

Boots Drug rallied to 48s. 9d. in advance of the full report and accounts and the chairman's annual statement. Beechams deferred were 11s. 3d. and Sangers 28s. 7½d. Oil shares showed irregular movements. Anglo-Iranian were unresponsive to the great financial strength of the accounts and high earnings last year, but C. C. Wakefield responded to the 300 per cent share bonus announced by the company.

British Chemical Prices

Market Reports

ACTIVE conditions have again been reported from most sections of the industrial chemicals market and a fair amount of new business has been put through. Inquiries for export continue to be prominent and there are hopes that the satisfactory export totals for May will be maintained. The awaited revision of prices for acetic acid and acetic anhydride have now been announced, the chief alterations being: commercial glacial acetic acid £70 per ton for contract quantities and acetic anhydride £100 per ton for 10-ton contracts. Magnesium chloride is reported to be £1 per ton cheaper at £17 5s. per ton. The week has produced no special features to record, but a steady improvement in the supply position has been noticeable in most directions. In the coal tar products market trade has been comparatively quiet and for most products the available supplies are sufficient to take care of requirements. A fair export business in pitch is reported at competitive prices.

MANCHESTER.—Allowing for continued holiday influences, which are affecting the movement of supplies into actual consumption, fairly active trading conditions have been reported on the Manchester market for both light and heavy chemicals during the past week. There is a steady demand from domestic users for caustic soda and other alkalis, and also for the ammonia and potash compounds and a wide range of miscellaneous chemicals, while business on export account has been on a fair scale. Apart from the reductions in acetic acid and acetic anhydride, there has been little fresh movement of prices. In the tar products market business has been relatively quiet in most sections, though there is a fair call for carbolic acid and most of the light distillates.

GLASGOW.—There has been little change in the Scottish chemical market and general conditions are noticeably quiet. This will probably have some effect on the turnover of chemicals in the course of a week or two. There has been increased interest in recent weeks in borax for weed-control. There has also been a heavier buying of plating salts. The consumption of formaldehyde in Scotland continues to increase. In the export market negotiations are in progress, particularly with Argentinian buyers.

ERP and Italian Plastics

In view of the large distribution of polyvinyl chloride (valued at $2.5 million), proposed under the ERP scheme, the Italian Chemical Association is endeavouring to procure a more rational distribution of licences. Authorities are expected to give the matter favourable consideration, as plastics made in Italy are now of high quality and produced at competitive prices. Home factories are stated to be capable of producing 1800 tons a year.

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2. at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Processes for the recovery of riboflavin.—Commercial Solvents Corporation. May 28, 1943. 621,552.

Production of fluorocarbons.—I.C.I., Ltd., and N. F. Sarsfield. July 19, 1943. 621,555.

Induction heating apparatus.—Induction Heating Corporation. Dec. 26, 1942. 621,725.

Lead chambers for manufacture of sulphuric acid.—A. M. Fairlie. March 17, 1944. 621,892.

Basic aluminium chloride.—W. R. Warner & Co., Inc. Dec. 31, 1943. 621,672.

Dispersion or dissemination of insecticides, fungicides, weed-killers and the like.—E. W. Bateman, and W. Fletcher. Jan. 8, 1945. 621,732.

Dispersion or dissemination of insecticides, fungicides, weed-killers or the like.—E. W. Bateman, and W. Fletcher. April 30, 1945. 621,894.

Coating processes and apparatus therefor.—British Thomson-Houston Co., Ltd. May 11, 1944. 621,734.

Production of 1:5-pentanediol.—I.C.I., Ltd,. J. G. M. Bremner, and F. Starkey. May 25, 1945. 621,735.

Methods of making curved iron cores for electromagnetic induction apparatus.—British Thomson-Houston Co., Ltd. June 1, 1944. 621,676.

Thermoplastic composition.—Austenal Laboratories, Inc. May 20, 1944. 621,845.

Laminated products and methods of making them.—G. F. Rayner. (Sylvania Industrial Corporation.) July 18, 1945. 621,950.

Means for heating insulating material prior to the working thereof.—British N. S. F. Co., Ltd., and K. G. Smith. July 19, 1945. 621,783.

Manufacture of polyvinyl acetal resins.—Shawinigan Chemicals, Ltd. Aug. 19, 1944. 621,784.

Manufacture of heat cast refractories.—Corning Glass Works. Aug. 1, 1944. 621,736.

Apparatus for the pulverisation of liquids in the form of aerosols.—Soc. Anon. Teco. July 27, 1943. 621,785.

Refractories.—C. Smith, W. E. Smith, and D. E. B. Green-Smith. Aug. 23, 1945. 621,737.

Drying oils.—Bakelite, Ltd. Dec. 14, 1944. 621,953.

Cements containing a hydrolysable organo-silicon compound and refractory objects prepared therewith.—N. Evans, H. G. Emblem, C. Shaw, and W. E. Smith. Nov. 28, 1945. 621,740.

Apparatus for recovering water soluble metallic salts in waste plant effluents or spent process liquors.—Firestone Tyre & Rubber Co. Dec. 13, 1944. 621,741.

Condensation-polymerisation products of silicon ortho-esters.—B. Gluck, W. E. Smith, and C. Shaw. Feb. 2, 1946. 621,742.

Production of furfuryl alcohol.—I.C.I., Ltd., D. G. Jones, J. G. M. Bremner, and R. K. F. Keeys. Feb. 26, 1946. 621,743.

Hydrogenation of cyclic organic compounds.—I.C.I., Ltd., and D. G. Jones. Feb. 27, 1946. 621,744.

Catalysts and their use.—I.C.I., Ltd., and P. W. Reynolds. May 3, 1946. 621,749.

Method and apparatus for the continuous crystallisation in vacuo of sugar solution and the like.—G. L. Williame. Sept. 30, 1941. 621,797.

Method of preparing hexachlorobenzene.—J. Dorleijn. May 29, 1946. 621,962.

Agglomeration processes, applicable to ceramic materials or the like, and products resulting therefrom.—Soc. Française Radio-Electrique. July 17, 1945. 621,602.

Process for decreasing the swelling-value and for increasing the acid-resistance of casein-threads and of fabrics made therefrom.—N.V. Onder-Zoekingsinstituut Research. Sept. 7, 1945. 621,753.

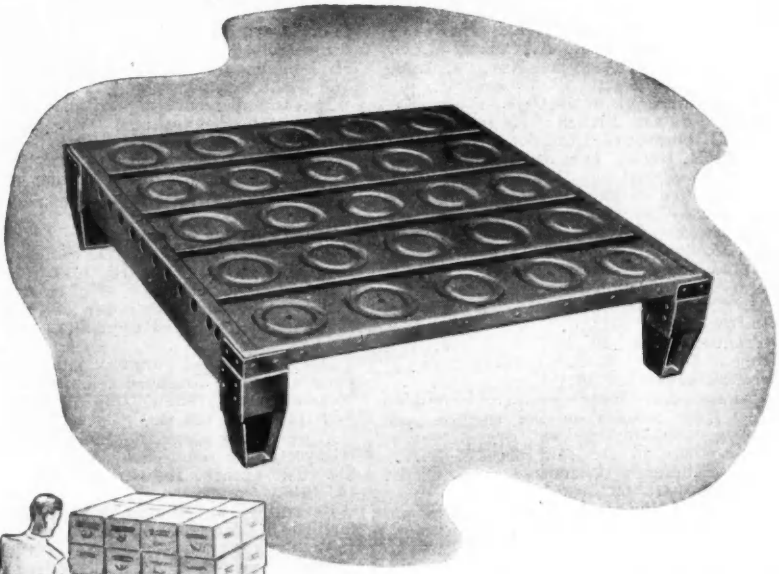
Process for the extraction or recovery of oil and other products from herring and other fish.—J. H. Jenssen, N. W. Bye-Wiers, and P. O. Skjeslien. [trading as Konsortium Apoteger D. A. Hansens Sildeforedlingsmetoder]. March 22, 1941. 621,877.

Process for the catalytic synthesis of hydrocarbons.—C. Arnold. (Standard Oil Development Co.) Aug. 23, 1946. 621,902.

Thermo-hardenable organo-silicic resins.—Soc. des Usines Chimiques Rhone-Poulenc. July 27, 1946. 621,883.

Resin-like copolymers.—C. Arnold. (Standard Oil Development Co.) Oct. 28, 1946. 621,703.

Process of preparing penicillamine disulphides.—Merck & Co., Inc. Dec. 20, 1945. 621,915.



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Method of carbonisation and activation of granulated or pulverulent carbonaceous materials.—Compagnie Industrielle de Procedes et d'Applications Soc. Anon. Aug. 15, 1946. 621,942.

Apparatus for obtaining a combustible gas by fermentation of organic materials.—G. L. R. Ducellier, and M. A. Isman. Jan. 22, 1943. 621,771.

Production of stainless steel.—W. W. Triggs. (Alloy Research Corporation.) Dec. 28, 1944. 622,194.

Process for forming water-insoluble layers from colloids on the surfaces of materials and for making dry preparations for use in the said process.—N.V. W. A. Scholten's Chemische Fabrieken. Arpil 25, 1941. 622,208.

Method of and apparatus for purifying raw water from humic substances.—A. M. R. Karlstrom. April 12, 1946. 622,282.

Apparatus for growing crystals.—Western Electric Co., Inc. June 11, 1945. 622,113.

Agglomeration processes, applicable to ceramic materials and the like, and products resulting therefrom.—Soc. Française Radio-Electrique. July 17, 1945. 622,117.

Alkyd copolymers.—Wingfoot Corporation. March 5, 1946. 622,235.

Preparation of organo-silicic oils.—Soc. des Usines Chimiques Rhone-Poulenc. June 28, 1946. 622,129.

Polythene compositions.—E. I. Du Pont de Nemours & Co. Nov. 3, 1945. 622,252.

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Methods of preparing hydrocarbon-substituted silanes.—British Thomson-Houston Co., Ltd. March 1, 1946. 622,323.

Catalytic oxidation of hydrogen sulphide in gaseous mixtures.—Gas Light & Coke Co., R. H. Griffith, and W. B. S. Newling. March 1, 1947. 622,324.

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Process of recovering sterols and like cyclopentanophenanthrene compounds.—American Cholesterol Products. Sept. 12, 1939. 622,725.

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Dehydrochlorination of chlorinated hydrocarbons and distillation of resulting compounds.—Solvay & Cie. Oct. 13, 1943. 622,642.

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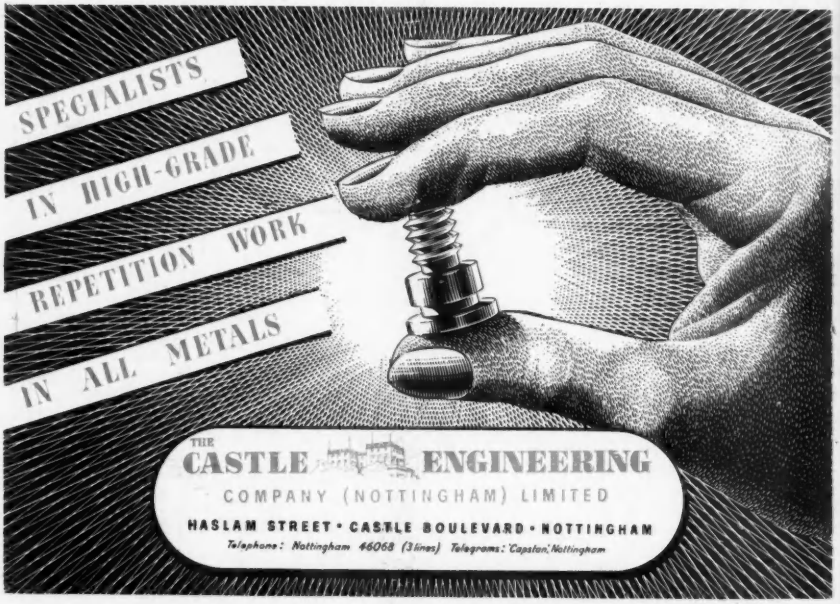

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